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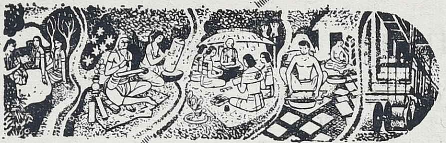

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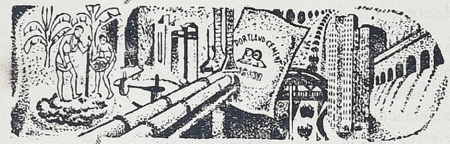

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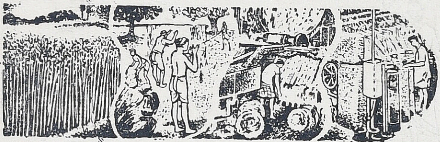

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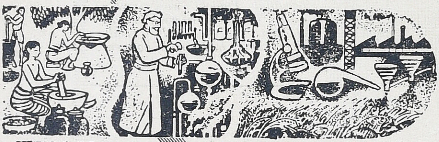

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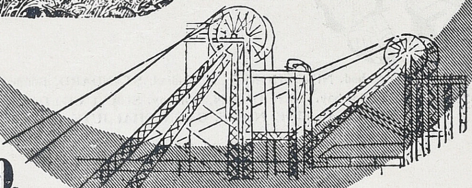

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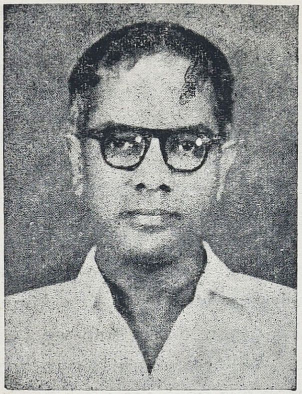

NEXT PLAN

Wherever I go and whomsoever I meet, these questions are violently flung at me: What Next? Whither India? Whither Nehru's India?

The hurry that is prompting our captains of Government to take the millions of masses to their cherished goal through labyrinths, dark with gloom and uncertainties, sets every intellectual at unrest. The goal of our nation set up at Avadi, accompanied by Nagpur and Ooty Resolutions with a devastating urge, is well reflected in the high figure of over Rs. 10,000 crores our national leaders have determined to have for the Third Plan.

As our beloved Prime Minister proclaims his ideal day in and day out, India is wedded to Socialism of a new order. It does not smack of Kremlin or Hyde Park. Its genius lies in its nativity. In that we are really proud, proud of our individuality, its value of actuality. No exotic 'ism' stains its radiance. It is a flame grown out of a Gandhian spark spreading itself and blazing aglow in 400 million hearts. It has no extinction. It will blaze and send out its roots and branches all over the Orient. It will stay aglow, as long as humanity lasts.

To make rich less richer and poor less poorer—this is the goal of India, the goal of the venerable East, the ultimate goal of all nations.

As Nehruji brilliantly points out in his most pensive article, India has to catch up with other occidental nations in the economic race with great many a handicap. There, economic revolution preceded political revolution. But in India and other Asian-African nations, we got political freedom and we are left to shape our economic progress with all our natural resources unexploited. Well, we have started our race

In England they say:

"Cut your coat according to your cloth"

In Industry they say:

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with a will to reach the goal in a decade or two which took west a century or two.

Further in this dynamics of change, some nations resorted to bloodshed to get rid of protests. But we achieved by acts of parliament the same results that carnage effected.

India's progress in a decade is really phenomenal. The illustrious writers in this Annual have portrayed the gigantic progress we have made in all fields. We are racing to our goal. But before we reach our goal, we are bound to face cruel hardships that may spell a slack in our pace, trials that depression will breed and million troubles in its wake.

What we have achieved so far have won appreciation at all capitals of foreign nations. United States, Great Britain, U.S.S.R., Canada, France, Australia, Germany, Japan have all given us economic aids that run into over a couple of billion dollars. They are still offering further help. In United States, particularly, great Senators and industrialists are urging economic aid to India to the tune of over a billion a year. And they are convinced that aid to India is the only effective check to the violent spread of leftist regeme. But we can look up to foreign aid only at crucial moments, not always. We have to shape our destiny with our resources. In the First Five Year Plan we have built mighty river projects and millions of acres are added to cultivation. Other magnificent dams and power projects are coming up and by 1961 we will harness the floods and feed our fields with their surge. More power will breed more Industries.

The Public Sector is slowly and steadily enlarging its area of operation, cutting into the priveleges and province of Private Sector. Quite strangely, our Prime Minister is all praise

of Public Sector and its achievements, and urges its sovereign sway over all economic activities. State Trading, by the end of Third Five Year Plan, will engulf in its fold the vital arteries of daytoday commerce and trade. Then what about millions of traders who will be thrown out? The Government will offer their help but it will not come to the helpless victims in time.

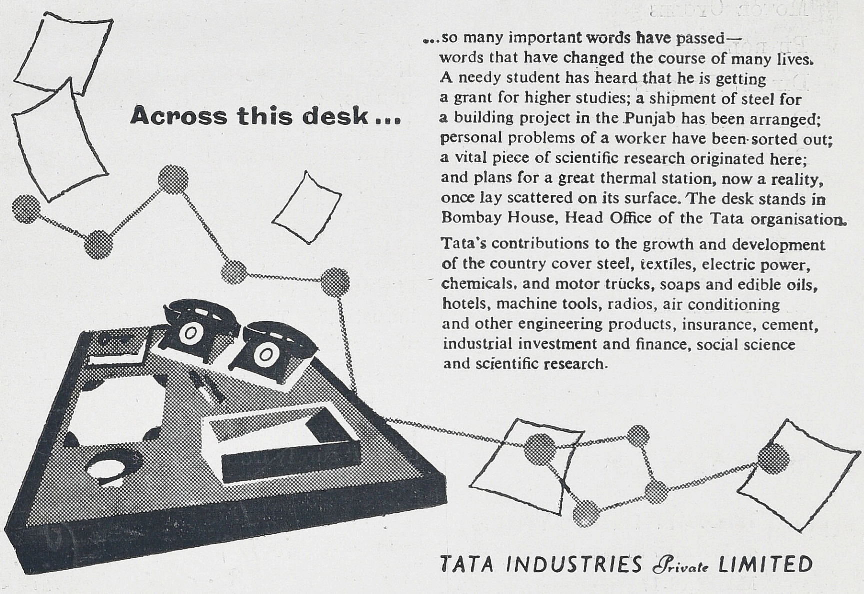
The governmental hurry to 'publicsector' trade activities in everydayness defies our understanding.

Why is the hurry? Where are the right men? Why adding agonies to crisis after crisis?

The same in co-operative farming. Service co-operatives may do a lot of good. But we must raise in our peasants the urge to grow more food by propoganda, not by coercion. To argue they are unwilling to keep pace with accelerated industrial progress, is escapism.

Our villages are autonomous units, enjoying political and economic freedom for hundreds of centuries. Even to British rule they bent; they did not break. They are not in a hurry to emulate exotic freedoms. They are willing to work, provided some friend of them tells them it is to their good.

The greatest achievement we have had since independence is Community Development that covers five lakhs of villages. We have in each block more than 60 officers who have taken to their work as their Mission in life. They are a team of selfless people, wedded to the nobility of the task they have taken up. They go from village to village, talk to their menfolk, womenfolk, play with their children. They have persuaded them to put up new recreation centres, new reading rooms, public hospitals, public gardens, Educational Centres. They talk to them in distress, smile with their joy and stand by them



Across this desk...

...so many important words have passed—
words that have changed the course of many lives.
A needy student has heard that he is getting
a grant for higher studies; a shipment of steel for
a building project in the Punjab has been arranged;
personal problems of a worker have been sorted out;
a vital piece of scientific research originated here;
and plans for a great thermal station, now a reality,
once lay scattered on its surface. The desk stands in
Bombay House, Head Office of the Tata organisation.

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in storm and thunder. They are humanising the aspirations and ideals of millions of peasants.

They have today a greater task to do. They alone can convince the villagers and the villagers trust them.

We have enough of huge steel plants and Mills and Foundries.

It is time we carry industries right into the heart of villages.

In the Third Plan, we must allot over Rs. 1000 crores for village industries. That will be the only way to keep all villagers busy.

In China, all peasants are trained to some village industry or other. Our peasants are excellent people. We have thousands of Block Development officers and workers who will convince each villager of the effectiveness of taking up industrial occupation as a pastime.

We must have one million steel plants—small village plants with a capacity for 50 tons a year—and that day alone will usher in the RAM RAJ, the Father of Nation passionately prayed for. Our leaders must stop crying for the moon. We have made enough progress. If Gandhi were alive, an intellectual honestly doubts, whether all these mammoth factories would have been permitted to spring up. Ghandhi will plead for more village industries, more amenities to villagers, more freedom to own and till the soil of their forefathers.

In the light of the dynamic progress we have achieved on all fronts, I will urge our Ministers to give more thoughts to village industries. That will keep fifty million people at work. And work brings wages and wages assure welfare and wealth to 30 crores of rural masses.

The national income will not only double up, but surely treble.

Krishna Srinivas

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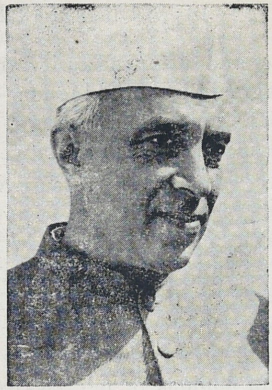

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MILLION PROBLEMS

JAWAHARLAL NEHRU

Prime Minister of India

When asked a question I remember, once, as to what were and how many problems we had to face in India, I said 360 million problems. Because all those seem to me as living individual entities to be helped, to be looked after, to be co-operated with. Way-farers, fellow-travellers ; in one direction, we are all going together. And so we thought of appointing a Planning Commission, because our resources were obviously limited.

We appointed a Planning Commission and the Planning Commission thought and conferred with all manner of folk and experts. And, we drew up the Five Year Plan, our First Five Year Plan. The stress in that first Five Year Plan was on the improvement of agriculture and higher yields. We had a number of river valley schemes—huge efforts which would provide irrigation facilities to large tracts of country. We also naturally provided for certain industrial development in the First Five Year Plan. Then, it so happened, that we had some good fortune in regard to our monsoons and our harvests. And our production increased.

Industrial development again made us think rather of the basic industries, the mother industries, out of which would arise other industries. And, so we planned the Second Five Year Plan where we laid stress on agriculture, but we talked a little more about industrial development. And we plann-

ed and were ambitious enough to plan—three or four huge new Iron and Steel plants; we thought of a machine building plant, we thought of many other things like that: basic industries. Because we realised that unless we laid the foundations there, our industrial progress would be slow and we would be far too much dependent on external factors. Then came a jolt. The two good harvests were succeeded by three atrocious ones. An extraordinary run of bad luck. Uptill now, quite an unusual run of bad luck which knocked us on the head and knocked very much more the poor peasant on the head. It upset all our planning—agricultural or industrial, because our resources which were limited enough had to be diverted to imports of food grains,—heavy imports.

And, in a country like India where the main price-determining factor is food grains, if food grain prices rise that affects other things. We did not want all the estimates of our Second Five Year Plan to be upset; because they would be upset if the prices rose. The basis even of our industrial advance was a stable agricultural foundation. Of course, apart from industry, agriculture is important enough for us—very important, 80 per cent of our people are engaged in it. It is obviously important for us to have enough food for everyone. But even from the point of view of industrial advance it was essential that there should be an adequate agricultural advance in production so that even if bad seasons come, the monsoon fails us, or drought of flood, we can survive it without much difficulty. So that our prices should not rise too much. We want our farmers to have good prices. But much as we favour that we have to remember the consequences of that on our economy. Everything goes up, salaries go up, wages go up, and all our estimates for planning are shaken to their foundations. So, we realised even more than we had ever done before, the absolute and utter necessity of concentrating on agricultural production—both food production and commercial crops which bring us much needed foreign exchange.

Potentially, we have the resources. Potentially, we have great wealth, and I have no doubt, we will get it, actually. But it will take time and hard labour. The point is that today we don't possess it. It is all potential. So while our resources were limited we gained political freedom, and political consciousness spread to hundreds of millions of our people. We gave them adult franchise; to everybody, including the people who might be called socially very backward, tribal people; people in the jungle—everybody had the vote. But the people quite rightly began to make demands upon us—very legitimate demands—to improve their standards. But we did not have and do not have the resources to fulfil those demands. So this great difficulty faces us, a difficulty which is common to most countries in Asia, may be in Africa. But a difficulty which in this way did not come to the countries of Western Europe or America. Because in those countries of Western Europe and America economic advance took place over a fairly long period of time, great resources were built up, or considerable resources were built up,—before the age for these acute political demands came. After all, even in a country like England adult suffrage came quite recently. Throughout the 19th century the suffrage was very limited; and its democracy therefore was a limited democracy; and, therefore, demands from the other people who were not politically strong enough to push them forward in Parliament, those demands could not be pressed with any strength. They could partly be ignored. My point is that economic advance took place, there, resources were built up in these countries, before the demands made upon them became too strong. And when the demands

came they could be met. The economic revolution, in other words, took place before the full political revolution in these countries. Now, here, the process has been reversed, we have the full 100 per cent political revolution and every man a sharer in it ; and the economic revolution slowly coming at a strange pace building up resources. And, the problem always is what to do at a particular moment when a legitimate demand is made which we agree with, but we haven't got the resources to fulfil.

Some countries have made, in recent years, very remarkable progress in industrial development. Very remarkable indeed, in industrial development, in education and in health etc. But that rate of progress, so far as I know has not been shown in agriculture. Agriculture proves to be a tougher problem. It is not very difficult for me, given the resources, to put up three or four steel plants. Well we pay for them, we train some people and the steel plant starts working after three or four years or five years, although it takes much longer to train the human commodity. But it is a much more difficult job to deal with these vast masses of agricultural population. They have to be convinced ; and the right approach always in convincing them is in a friendly way ; and more specially by example. Nothing goes as far as example. But still, the fact remains that one is held up. All one's tremendous enthusiasm suffers shocks coming up against this tremendous wall of humanity used to certain methods of working. What is much more unfortunate is a certain lack of initiative coming from both from poverty and from habits—Governmental habits—in the country which do not encourage initiative. And the poor man, poor peasant, looks to some Governmental apparatus, some semi-God's advice, to work things for him which, of course, is a very bad thing. The essential thing required for him is the spirit of self-reliance, a spirit of self-help, and a spirit of cooperation.

Now one other thing has happened. We very rightly, I think, put an end to large landed estates. We gave them some compensation and took them over. And, by and large, created peasant proprietors, most of them rather small. Now the old big landlord, by custom and convention, and in his own interest, did one thing, performed a social duty by looking after the wells and the tanks in the villages which used to irrigate that land. Now the big landlord ceases to be the big landlord. He becomes a small one. The normal thing would have been for the village community to take charge of the wells and the tanks. They didn't. They were used to it. They expected somebody else to do it for them. May be it was our fault, but by our fault I mean of the local authority. But the result was we suddenly realised after a few years that tens of thousands of wells and tanks have gone to pieces ; and cannot be used properly ; it involves enormous labour to build them up again. And we have to build them up. But it is impossible, really, for the Governmental apparatus to go about repairing every village well and every village tank. It is for the village community to do it. They must have that initiative, enterprise ; and, they can do it ; and they will do it.

I am terribly anxious to root out this ingrained habit of many of our people, ingrained during British times of not developing their own initiative and relying on somebody else to do things for them. It is of course the habit of poverty, I am anxious that the cooperative should be the peasants' cooperative, not a state cooperative imposed on the peasant and run by state officials.

The argument is that the small cooperative has very little resources. True, the only

way is to join up a number of small cooperatives into bigger federations or call them what you will, and give expert advice and all that. As you know, any problem involving human beings is difficult. Large numbers of human beings, it becomes more difficult. In agriculture, we have to deal not only with men and women but with animals and plants and all kinds of things and find some balance between them. A little upsets the whole thing and the planning will go to pieces. So that, all these difficulties which are there, they come and they are dealt with, no doubt, and they are got over. But the progress becomes slower than one has thought; and sometimes a little bit of frustration comes in: why cannot we go ahead faster? But then one remembers that we are on the march. We are not marching by ourselves—individuals, or small groups. We are a large brotherhood of 360 million people on the march; and, we have all to go together and we cannot run away from each other; and we have all to help each other in this process. I do believe that the initial difficulty having been got over the pace will become faster because, as I said, I have tremendous faith in the innate good sense and intelligence of our people and of our peasants! ★

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PROGRESS OF INDUSTRIES

LAL BAHADUR SHASTRI

Union Minister of Commerce and Industry

The vast crowds that witnessed the brief ceremonies on August 15, 1947, went almost hysterical all over the country. They had witnessed the end of one age and the beginning of another, the transfer of power for the governance of the country to the representatives of the people. And that power was to be exercised for the benefit not of the priviliged few but of the many, indeed the entire populace of the country. All over there was an upsurge of emotion, a desire to lay the foundations of a New India. A heavy burden was thus cast on those who took over the tremendous responsibility.

Determined economic effort

The first and foremost task of the new Government was to ensure political and administrative consolidation, and as soon as this was achieved, attention was devoted to the question of economic development. The importance of securing a continuous increase in production was stressed as early as 1948 and the State undertook to play a progressively active role in the industrialisation of the country, but a more determined effort began with the first Five-Year Plan.

Fruits of Industrialisation

The main emphasis during the first Five-Year Plan was on increased agricultural production on which depended the level of the national income, the supply of raw materials to important industries like the cotton textiles and jute, and last but not the least the country's balance of trade. The first steps for the indus-

trialisation of the country were also taken during this period. A State-owned fertilizer factory and two oil refineries were established in the country with the help of foreign agencies, while private enterprise, especially in steel, cement, sugar, light engineering industries and a varied range of other manufactures, achieved substantial expansion in production. The overall increase in industrial praduction achieved during the First Plan period was about 38 per cent. Production of capital goods increased by about 70 per cent, while the production of intermediate goods, especially raw materials required by industries and consumer goods, went up by about 34 per cent. The country's first planned attempt in recent history to harness constructive thought and opinion for the maximum exploitation of our resources was successful to this extent and the Second Plan started off on a note of optimism.

Public and Private Sectors

At this stage a restatement of industrial policy was made which, while acknowledging the need for accelerating the pace of economic growth, laid special emphasis on the industrialisation of the country. In this development both the public and private sectors have to co-operate with each other fully. The Government has always felt that the two sectors cannot exactly work in watertight compartments and the two can complement and supplement each other, if necessary. The expansion of steel plants in the private sector; and at the same time establishment of new steel plants in the public sector, the cement factories owned and run by some State Governments; while at the same time the cement industry as such being very largely in private hands are examples of how this could be achieved. However, the objective the State placed before itself was to assume progressively a predominant and direct responsibility for setting up new industries and at the same time reducing inequalities and concentrations of economic power by suitable economic action.

The State also accepted responsibility for the development of certain basic and strategic industries and industries in the nature of public utility services or which required investment on a scale which only the State could afford. An obligation has been cast on the State to display increasing initiative in respect of new development in some other specified industries also without, of course, handicapping expansion by private enterprise. The development of numerous industries has been left to the initiative and enterprise of the private sector although the State can, of course, intervene, if necessary. For instance, the private sector can give full play to its efforts in the expansion of industries like the cement, automobile, chemical, paper, and light engineering manufactures. At the same time, responsibility for the further development of industries like the steel, coal, fertilizer, heavy machinery, heavy electrical plant, locomotive and railway rolling stock, antibiotics and machine tool has been assumed by the State.

Steady rise in Industrial Output

Increasing expenditure on industrial development is reflected by the steady increase in the index of industrial production. The increase since 1954 ranges between 7 to 11 per cent per annum. This increase in the index of industrial production does not, however, do sufficient justice to the tempo of industrialisation in the country because of the weightage given to industries like the jute, cotton textiles, etc., which are not developing industries and where the rise in production has not been as impressive as compared with that some of the newer industries. If we take into consideration the indices of production of these industries only, the pace of progress would be found to be more encouraging.

All-round increase in production

The following figures are illustrative not only of the wide range over which industrial production has developed but also of the all-round increase in production over the last ten years:

Name of Industry	Unit	Production in 1947	Production in 1957
Metals	Tons		
Aluminium	,,	Nil	10,923

Copper (sheets and circles)	,,	Nil	2,380
Steel (finished)	,,	890,000	1,350,000
Engineering Industries	Nos		
Automobiles	,,	Nil	31,900
Bicycles (complete)	,,	31,900	790,500
Diesel Engines	,,		
(a) Stationary	,,	684	16,644
(b) Vehicular type	,,	...	3,336
Electric fans	,,	160,000	524,000
Electric lamps	,,	7,600,000	33,149.000
Electrical motors	H.P.	38,400	496,200
Machine tools	Lakhs Rs.	46	251
Power driven pumps	Nos	6,000	63,600
Radio receivers	,,	3,040	190,700
Storage batteries	,,	70,000	324,000
Transformers (Power)	KVA	32,400	1,219,200
Non-Engineering Industries	Tons		
Cement	,,	1,450,000	5,600,000
Coal	,,	30,000,000	43,530,000
Ammonium sulphate	,,	21,300	379,700
Caustic soda	,,	3,300	42,700
Newsprint	,,	Nil	10,000
Paper and paper-board	,,	93,100	210,100
Salt	Mds	1,889,000	3,600,000
Soda ash	Tons	13,600	91,900
Sugar	,,	1,075,000	2,038,000
Sulphuric acid	,,	60,000	196,100
Superphosphate	,,	5,000	141,700
Textiles			
(a) Cotton:			
(i) Cloth	Mill yds	3,762	5,517
(ii) Yarn	,,	1,206	1,780
(b) Woollen/Worsted:			
Fabrics	Mill yds	Nil	15.8
(c) Jute textiles	Tons	1,051,200	1,029,600
Tyres (automobiles)	Nos	810,000	990,000
Tyres (cycles)	,,	3,228,000	7,152,000
Tubes (automobiles)	,,	820,800	1,136,000
Tubes (cycles)	,,	4,322,400	7,027,200

Engineering Industries make headway

The engineering group of industries have to their credit the two locomotive works, one in the public sector owned by TELCO, the steel plants, the oil refineries, the integral coach building factory at Perambur, Hindustan Shipyard, Hindustan Machine Tools, the automobile industries and a large number of units operated by private enterprise manufacturing jute and sugar mill machinery, textile machinery and components, machine tools, steel tubes and pipes, boilers, steel structurals, wagons and other rolling stock for the railways, storage batteries, transformers, electric conductors, radio receivers, electric motors and diesel engines.

The rapid progress achived by the chemical industries has made the country self-sufficient in respect of hydrogen peroxide, bichromates, sulphur black, sheet glass, cement, cellulose, acetate yarn, staple fibre, tyres and tubes, varnishes and paints and inks. By the end of the Second Plan we hope to be self-sufficient in soda ash, caustic soda, hydrosulphate of soda, chlorin, bleaching powder, calcium carbide, antiboitics, plastics and such as polythene and all types of paper (other than newsprint). Other notable achievements are the fertilizer factories at Sindri, Nangal and Alwaye, the antibiotic factory at Pimpri and many private owned undertakings manufacturing a wide range of chemicals, drugs and pharmaceuticals.

Remarkable Progress in Chemicals

Capacity in the engineering and chemical groups of industries was negligible in 1939 and even in 1947 could only be described as nominal. The post-war and the immediate post-Independence period was a time of stress and the country's economy was severely tested but even so the record of progress of our industries is indeed something remarkable.

The basic materials for the development of our industrial economy like fertilizers, sulphuric acid and caustic soda on which a large number of industries depend have recorded a large increase in production as will be evident from the following figures :

(In tons per annum)

Industry	Before Independence	Current
Fertilizers (in terms of superphosphate)	5,000	141,700
Sulphuric acid	63,000	196,100
Caustic soda	4,000	42,700

Some Industries exceed targets

Tha Central Advisory Council for Industries, the Development Councils and panels for

various industries advise the Government from time to time on the programme and progress of industrial development. A committee consisting of representatives of the various Ministries of the Government of India, the State Governments concerned and the Planning Commission examines all cases of fresh licensing and expansion under the provisions of the Industries (Development and Regulation) Act and advises the Government. A sub-committee of the Central Advisory Council for Industries periodically reviews the decisions taken by the Government (as a result of the recommendations made by the Licensing Committee) on schemes requiring licences under the Industries (Development and Regulation) Act. As a result of the careful watch over the situation some industries may well exceed the targets set for them under the Second Five-Year Plan.

Role of Small Scale Industries

I shall not like to deal here with small-scale and cottage industries in detail, although I do realise that they can play an important part in the economy of our country. There is no doubt that they have got a large employment potential and I shall merely give the example of the handloom weaving industry which provides employment and support for about 2·5 million families. The production of handloom cloth has been increasing steadily since 1954 and in 1957 it was of the order of 1,680 million yards. Similarly the following figures will give an idea of the development of *khadi* and the people employed in it.

	Production of cloth during 1957-58 m. sq. yd.	Value Rs. lakhs	Employment created during 1957-58
Traditional khadi ...	49·32	737·85	651,000
Khadi from the Ambar Charka	11·15	195·12*	109,000

*Estimated @ 1/12 per sq. yd.

Production in a village industries during 1957-58 is estimated at Rs. 20.4 lakhs and it is calculated that 65,675 persons were provided employment during the same period.

Nature of priority

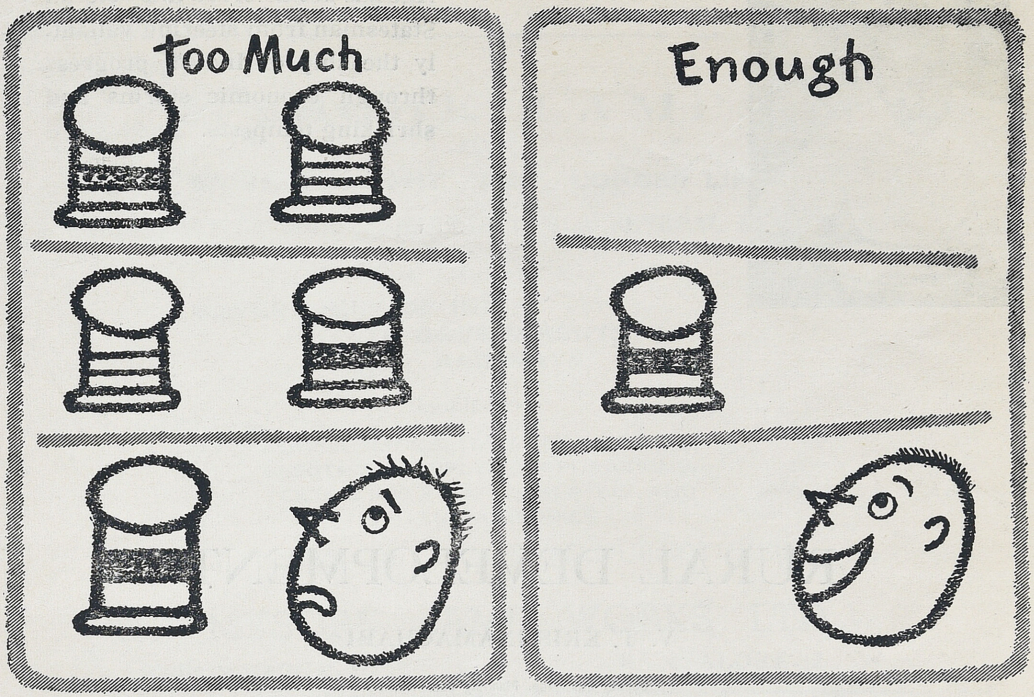
The development of heavy and basic industries is very important and we have rightly laid the utmost stress on them. We have, however, to consider the industrial development in the country keeping in view our overall position in regard to internal as well as external resources. We may have, perhaps, to make a careful and fresh assessment of those items of heavy industries which have to be completed and of those which should be newly set up within a prescribed time. We will naturally have to give priority to those industries which will help us reduce the drain on our foreign exchange. We may have to consider other necessary aspects also. Once having decided upon this, our general attitude should be to build up and develop industries with a bias on indigenous raw material and machinery etc. What I mean to suggest is that we should increasingly consider if we could produce the tools, parts and parts and components as well as machinery in our country for our industrial needs with the help of the small-scale industry. Instead of importing machines from abroad and finding it difficult to secure the necessary foreign exchange, would it not be desirable to make them here? This will also help in providing more employment to our people. Our industries in future should be indigenously based and should have the capacity to provide more employment.

The progress we have so far made in the small-scale sector could perhaps be considered satisfactory from a limited point of view. But we are yet to go very far. What is most important is to remedy the major shortcomings in the small-scale industry—lack of credit facilities, technical "know-how", and difficulties in marketing. The Government is attending to these problems and certain positive steps have already been taken.

There is so much to be said about industries and industrial development that it is hardly possible to make even a passing reference to each aspect. I would, therefore, wish to conclude now, but before doing so I should like to make a few general observations.

On the right track

In our march towards the establishment of an industrial economy within the country, we have kept to the right track. Our pace has been steady. It has also been as rapid as our own resources and help from abroad would permit. A dispassionate review of the past fills us with every hope for the future. It is bright and should be bright. Mistakes we may have made, but we can learn from them and make even more determined efforts to go ahead. ***



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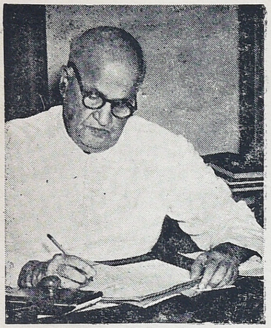

Age has not deterred this veteran Statesman from steering valiantly the ship of India's progress through economic storms and shrieking tempests.

RURAL DEVELOPMENT

V. T. KRISHNAMACHARI

Deputy Chairman, Planning Commission

In India the cooperative movement began largely as a credit movement more than 50 years ago. The primary rural societies were generally organised on the Raiffeisen pattern. To a large extent, the movement was in the hands of non-official leaders, most of whom were attracted to it because of its moral aspects. They made the spread of the movement their life-work and by their single-minded devotion built up a well organised structure. Their effort has always been to maintain it as a genuine people's movement. By the end of 1955-56, taking only rural agricultural credit societies, there were 16 ,000 societies with 7.8 million members, share capital of Rs. 16.8 crores and working capital of Rs. 79.1 crores. During all these years, however, the movement worked under serious limitations as cooperation did not form part of a nationwide programme for scientific agriculture and general social and economic development as it was in the Western democracies. Our Five-Year Plans have brought a revolutionary change in this respect.

The First Five-Year Plan provided the conditions under which the cooperative movement could find the proper climate for growth, by allocating much larger finances than ever before for (*i*) irrigation and improvement of agricultural techniques ; (*ii*) a balanced industrial development ; and (*iii*) a widespread network of measures of social improvement under education, medical relief, public health etc. All this was besides its most significant contribution—the setting up of a Centrally-aided community development movement. The Second Five-Year Plan has made much larger allocations for all these purposes and there can be no doubt that in coming years, such programmes continue to have high priority. Besides this, the State will continue to provide technical and advisory services to guide the villagers and promote common action by them. The scope of research will go on increasing to meet the new problems arising from wide application of scientific techniques. The State is also providing the short, medium and long term finances needed. In these ways,

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the Five-Year Plans have created the conditions in which the village cooperatives should become the agency for carrying out the programmes of social and economic development included in the Plan and also mobilise for building up community assets the unutilised energy in the countryside. The existing societies should be revitalised and new ones set up with this purpose in view.

Speaking at Mount Abu, I indicated a comprehensive programme of work for village institutions, the panchayat and the cooperative. The panchayat should have the taxing and regulatory functions. But all programmes should be carried out through cooperatives, in which every family would be represented, by common consent, all members joining in the process of reaching decisions and giving effect to them. I set down the programme here :

(*i*) Multipurpose, large and medium projects : Construction of field channels needed to utilise the irrigation available and their maintenance in an efficient condition from day-to-day.

(*ii*) Minor irrigation works including tube-wells : The responsibility for maintaining these works and for excavating and maintaining field channels is the responsibility of the village.

(*iii*) Contour-bunding, soil conservation and other programmes for dry-farming in the dry areas and construction and maintenance of bunds.

(*iv*) Scientific dues agriculture :

(*a*) Producing as a permanent arrangement in the village all the seeds and organic and green manures needed ; arranging for the supply of these in kind to those who cannot pay for these in advance, recovering dues after harvest.

(*b*) Arranging for the distribution of fertilisers received for the village and their supply to the smaller holders on credit in the first instance.

(*c*) Promoting the use of Japanese method of cultivation in all areas suitable for it and

other advanced techniques for wheat and other crops which are suggested by the technical departments; and in other ways, work for a diversified agricultural economy.

(*d*) Development of animal husbandry programmes; dairy produce, fisheries, etc.

(*v*) Programmes for supplementary occupations: cottage and small-scale industries, etc.

(*vi*) Consolidation of holdings: A programme of consolidation of holdings is essential especially in areas which are irrigated or have assured rainfall for the effective implementation of the groups of programmes which I have indicated above.

(*vii*) Works for the benefit of the community: Every family should devote a portion of its time to building up permanent assets of value to the community.

(*viii*) Women and youth in the village should play their full part in these activities.

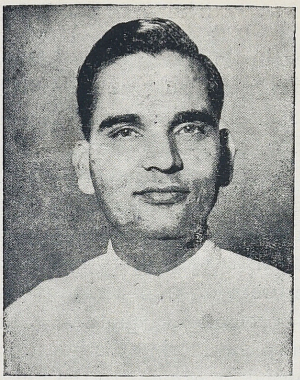
It is not to be expected that all these programmes will be undertaken by all societies. A beginning should be made with the more important ones. In other words, there should be a minimum programme which should be those directly related to increased agricultural production. As time goes on, societies should expand their programmes so as to cover all aspects of rural life. What should be remembered is that the cooperative method can be applied to an infinite variety of programmes. I should like to quote here from a paper written by R.K. Harper on community development:

> "The special objectives of community development are tersely defined in terms of more literates, increased general knowledge, higher ethical codes of behaviour, improved agricultural production, better health, better nutrition, fuller use of labour, capital formation in the forms of roads, wells, community centres, etc. There is not one of these objectives to the realisation of which cooperation cannot effectively contribute. Cooperative schools, and cooperative education in other schools, can produce more literates and higher standards of general knowledge and behaviour; cooperative agriculture can improve agricultural production; cooperative clinics and health centres can make for better health; cooperative consumers' stores, milk cooperatives and so on can insure better nutrition; cooperative labour organisations can promote fuller use of labour, can produce capital in the form of roads, wells, community centres, etc., all of which will raise the standards of the community which comes to possess them."

The village cooperatives should be linked up with cooperatives at higher levels, namely, unions, central banks and apex banks on the one side, and cooperative marketing, processing and other societies on the other.

The programme we have placed before ourselves can only be carried out if there are facilities for the training of non-official and official workers at all levels. In villages, those who are expected to work as members of panchayats and directors of cooperatives should receive training in their duties. I feel that in the next two or three years, we should aim at giving this training to 5 or 6 millions of workers in the villages. Also, promising youngmen and school masters should be trained to work as secretaries to panchayats and cooperatives. At the block level, again, there should be programmes for training those who want to work on panchayat; and cooperatives—similarly, at the district levels. Officials should also receive adequate training, with refresher courses at frequent intervals. The village level worker occupies a key position in the movement. It will be his duty to guide the 4 or 5 village societies that will work in his jurisdiction.

If the community development movement, of which cooperation is an essential part, is to be a genuinely popular movement, the State Governments should make efforts to enlist the support of large numbers of non-official workers who will find their reward in dedicating themselves to the movement. Over 60 years ago, Sir Frederick Nicholson who was a pioneer in the cooperative movement in India, wrote as follows: "What is really wanted is the advent of men of zeal, enthusiasm, devotion and perseverance, who will by personal labour solve the difficulties of the problems not on paper, but in actual practice; the philantropic reformers.... must sit down in the villages, as did their prototypes of the West, and must there establish the petty societies, which, as in Europe, shall contain the germ and promise of infinite potentialities." We have always had workers like this. But in the new India such men and women are needed in tens of thousands. Nothing can be more satisfying than to assist millions of families in the countryside to work together to eliminate poverty and raise living standards. It is only in this way that we can lay the foundation for the unity of India and preserve the values for which we have stood for many centuries. ***



Our most versatile Industry Minister sketches here the phenomenal progress of engineering industries and pleads powerfully for a dynamic export drive.

ENGINEERING INDUSTRIES

MANUBHAI SHAH

Union Minister of Industry

In the economic development of India in recent years, engineering industries have had a place of pride. The general index of industrial production in the engineering sector, which stood at 183 in 1955, i.e., prior to the commencement of the Second Plan, based on 100 for the year 1951, has risen to 260 in 1958. In terms of the estimated value of production of engineering goods, this rise has been from Rs. 180 crores in 1955 to Rs. 270 crores in 1958. In terms also of quantity, which is after all a better indicator of this growth, the engineering industries have a remarkable progress to their credit.

Production Diversified

The progress, in fact, is more marked than apparent when the greatly increased diversification of the range of production of engineering goods and the far greater self-sufficiency in the manufacture of components which make up the engineering goods, are considered. There is every reason to hope that this pronounced upward trend in the production of engineering goods would be sustained and most of the production targets laid down for engineering goods for the Second Plan would be achieved by 1961. Steps have already been taken by the Government in expanding the industrial base of the engineering sector in the Third Plan through the establishment of facilities for machine building and supporting services, like heavy castings, forgings, structurals and machines tools.

Exports Stagnant

While all this is gratifying, it is a little disquieting to note that export of engineering goods from this country has not kept

pace with their increased production in the country in recent years. It is in fact stagnating somewhat, as will be seen from the fact that while in 1956 it was of a value of Rs. 4.36 crores in 1957 it was not more than Rs. 4.38 crores, while in 1958, it had declined to roughly Rs. 4.15 crores, based on the first 11 months' actuals in that year. Representing as it does 1.6 per cent of indigenous production, the export in this field is not very encouraging. This is to some extent due to the serious limitation in the expansion of exports in this field, such as the expanding internal markets themselves in these goods, more so because of the restrictions on imports of finished engineering goods; physical shortages of supplies of both indigenous and imported raw materials; relatively higher costs of production in some of the engineering industries in the country compared to those in the mass production industries of our foreign competitors; inadequate commercial intelligence services on the state of foreign markets which are extremely sensitive; and difficulties in making entries into the foreign markets against established and entrenched brands of goods in those markets. As against these shortcomings, the Government have strained their every nerve to create a healthy climate in which such shortcomings could be reasonably overcome. For instance, Government have made arrangements for additional supplies of steel and pig iron and essential imported raw materials and components for export of engineering products against advance export commitments or on a replenishment basis; concessional prices for the twin bread and butter raw materials of engineering industries, namely, steel and pig iron for export; a flat rate of rebate of excise duty on rolled sections of indigenous steel which enter into exported engineering manufactures; simplification of the customs and excise duty rebate procedures by fixation of flat rates for each product exported; concessions in railway freight for selected engineering goods for export purposes; and so on. In addition to these concessions, Government have recently authorised the Iron and Steel Controller to give top priority to physical supplies of steel to exporter-manufacturers of engineering goods against export promotion quotas. The Government are also considering the question of giving preferential treatment to the units in the engineering industries with export performance to their credit in the matter of importation of even capital goods for augmenting their production capacity. They would further always be prepared to give sympathetic consideration to any *bona fide* and constructive suggestions for augmenting our export capacity in engineering goods.

Rs. Ten Crores Target Suggested

In the light of the above, it would be quite reasonable to expect the engineering industries to rise to the occasion and step up exports. A target of at least Rs. 10 crores worth of engineering goods can be attained per year by 1961. This figure is considered quite modest in relation to the volume of industrial production in the field. It is evident that in attaining this target, the engineering industries themselves should be prepared to go some way by cutting down their margins of profit or by even exporting at or below cost of production. I hope that this gesture would be forthcoming in adequate measure from the engineering industries, as after all with their expanding resources resultant from their increases inproduction and larger turnover of sales, in the internal market and certain price adjustments in the structure of internal sale prices, it should be possible for them to export their products in an increasing measure to foreign

markets at competitive prices. Export of engineering goods is not merely a "must" on the short term view of the present critical foreign exchange situation, but should be more so on a longer term prospect. Engineering industries in almost all industrially advanced countries have been established and consolidated with a specific provision for export capacity, to give them the needed resilience. In India, when the new steel plants go into full production and the existing productive facilities in the engineering industries themselves are considerably augmented, a problem dissimilar to the one prevailing at present may emerge. In order to keep their productive capacity fully engaged, the engineering industries may have to seek foreign outlets for their production in a far greater measure in future. To be prepared for this contingency, it would be, of course, prudent to start establishing the foreign markets right now.

Upward Trend in Certain Items

Exports of some of the engineering goods, like dry batteries, electric fans, room air-conditioners, rice, dal and flour mill machinery, sugar mill machinery, centrifugal pumps, sewing machines, water fittings, etc., are maintaining an upward trend, while those like aluminium utensils, some cast iron products, diesel engines, steel furniture, textile machinery, etc., are more or less maintaining their past exports. There are, however, a host of other engineering goods, like builders and domestic hardware, various types of industrial fasteners, like bolts, nuts, rivets and screws, etc., in which exports in the year 1958 had declined from the level attained in the previous year. There are other promising products, like bicycles, electric lamps, radio receivers, steel tubes, etc., in respect of which indigenous industries have not made any significant contribution in the export field, although local production has gone up phenomenally in recent years. These industries in particular and all other engineering industries in general, should embark on a vigorous export drive and make a substantial contribution to the earning of foreign exchange. In so doing, they will not only be benefiting the country in these critical times, but be also benefiting themselves through increased allocations of foreign exchange for essential raw materials and resultant higher production. If adequate voluntary efforts are forthcoming from the engineering industries in this direction to promote exports in a sizeable way, it may not be necessary for Government to think of any obligatory measures to secure this objective. ★

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MORARJI DESAI

Union Finance Minister

In a democracy, to which we are all wedded—at any rate I for myself believe in democracy as the only way of human advancement—the contentment of the people whom the Government serves, and who make the Government, is very vital if a stable Government is to exist and is to work. And that contentment can arise only from a consciousness that their lot is becoming better and better everyday and that within a measurable distance of time they will be free from the fear of not getting the bare necessities of life. Until they are assured of that, it is futile to expect them to work hard and to go on having faith more and more in democracy.

Thinking minds, and those who can think philosophically, can certainly always prefer, and would prefer, even poverty to dictatorship at any time if that is the only choice left before them—poverty with democracy or dictatorship with prosperity. Therefore, we cannot give sermons to the ordinary men in the matter; we have got to give them results. And it is this task in which the Government is engaged in this country with all sorts of pulls which you have not got to face in other countries. The handicaps which we have got to face in this country are enormous. The countries which are prosperous today and are industrially developed, developed in more leisurely times when there was not much let or hindrance, when there was much scope for them for exports and for getting wealth from other countries. That is not open to this country and even if it were open we would not like to do it because we do not want to profit by other people. We

want, on the contrary, to be prosperous in order that we can help other people and to be prosperous by our own efforts and in order to make the world happy, not only ourselves happy.

That has been our ideal in this country for ages and I trust that that will remain the ideal of this country for ages in future. We cannot apply the standards which you apply to advanced countries in whatever we have got to do in this country.

Expenditure and Wealth Taxes

It has been a fact all over the world in all Governments that those who pay taxes always consider that they are overtaxed and those who recover taxes always consider that they recover less and want to recover more and more. That has always been the struggle in the world, in all countries. But I have no doubt in my mind that all the taxes that are recovered in such a way that there is a minimum harassment. It has also to be seen that the taxes go on coming in in a larger measure every year and do not go to a diminishing return. Therefore, Government has got to see that the capacity of those who pay goes on increasing in paying the taxes, even if their willingness does not go on increasing, because it is difficult for Government to increase the willingness of anybody to pay taxes.

The Expenditure Tax was never considered as a source of large revenue. I am afraid, there you have not properly understood the intention of the Government. But the Expenditure Tax is levied more with a view to restricting expenditure so that there is more saving, so that there may be less spending which excites jealousies from the bulk of the population which is very vital if we are to live happily and if we are to have a proper democratic society. It is only with that this Expenditure Tax hax has been levied. I do not see that there has been any harassment so far because I have not received any complaint of harrassment so far I have not received even one complaint of harassment in the matter of

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Wealth Tax, how am I to believe that there is any harassment in these directions? A good surgeon is one who has to cut, but he cuts after anaesthesis; but in old days when there was no anaesthesia, people did subject themselves to surgery because they know that all the pains borne would give a dividend later on. Well, we are not very proficient in this anaesthesia of recovering taxes in such a way that people are very happy, but I should like to find out ways and means whereby we can do it. It is for that purpose that that Committee has been appointed and, I hope, the memorandum that you have given to them will be helpful. But it is a peculiar thing that I notice everywhere whenever I meet people who can pay taxes and more taxes that in whatever they say, the suggestions always lead to the lessening of the income of Government and never to its increase. I wish I got some suggestions, at any rate, which enabled me to make up the loss of revenue if I accepted some of the proposals made. Unless that is done, how am I to go ahead? How is a Government to go on working more and more for the good of the people if it has not more and more revenues every year? And what is a source of revenue? A source of revenue is only taxes, direct and indirect, or loans. But loans also have got to be paid from any profits that may be received from the utilisation of those loans, but mainly from the taxes—ultimately from the general public—because the surplus of the people in the country also can be tapped more through taxation than through any other method. And that is the well-recognised method in all Governments.

Plea for understanding

I would also request you to get into my position, imagine yourselves in my position and then judge what one can do because then we will come to a proper position. Just as you expect me to understand what you have got to and judge things from that point of view, it is all the more necessary that you should also do the same. I promise you that I shall always do that—and I always try to do that—because it is necessary for me to do so. I cannot afford to do otherwise. The interests of Government are vitally connected with the willing respect of people for the Government and attachment of people to the Government if Government is to function in a democracy. There may be some stresses and strains on occasions, but they must be only occasional and not the main thing and that is what we have got to achieve and that is what is achieved also by the meetings of minds from time to time so that we can understand these problems from time to time.

Basis behind Government Plans

As I said, in the world all peeple have got to see that the under-developed countries have got to be helped by the developed countries if the world is to live happily and if we are going to have a proper human society. So in this country itself we have got to see that there are some areas which are very backward, there are some areas which are very forward and we have got to help the backward areas in order that they may come come up at the same time though we do not want to see that the forward areas go down, in order to do that but the forward areas have got to have a little patience.

I tried to give you the basis on which the Government works and makes all its plans. We have got to go ahead because I may say that even in all that we are doing—even in the Second Five-Year Plan which is considered so very big—what are we going to get? Not more than 25 per cent increase in the national income, and even that will not be achieved because the plan has been curtailed to some extent on account of the stresses and strains. And if we can go on at that rate, then by 1975-76 we can double our national income *per capita*. And what is that? It will go from 280 to 560 or so, and what is that income? That is the present income of small countries like Ceylon and Egypt and which are also considered backward. That is, in 1975 we will be where they are just now. Will that be a great hope for the people? That is what we have got to consider when we consider all these things and it is therefore that I have been requesting to look at these matters from this point of view and not from the point of view of how it hurts you.

***

India's maritime glory is venerable. With the rising tempo of rapid industrialisation, our ports have a great future, rivalling their past glory.

INDIAN PORTS

S. K. PATIL

Union Minister for Transport and Communications

Our port operations and development have been the subject of study by two expert missions from abroad. One was a mission deputed by the U.K. Government under the Colombo Plan in October, 1957, to visit the major ports of Calcutta, Bombay, Vizagapatnam and Madras and advise on cargo handling and other port operational problems. Their reports on the subject included suggestions regarding the speeding up of movement of cargoes from and to the ports by the provision of suitable railway wagons, streamlining of customs formalities, imposition of penal rates of demurrage on consignees for delay in the removal of cargoes, provision of more mechanical aids, improvement in the maintenance of equipment of all kinds and taking a more co-ordinated view of traffic requirements in the planning of berths and other physical facilities. The Mission, however, urged caution in the matter of introducing large-scale mechanisation before ensuring the cooperation of labour. Orders for a large portion of the equipment recommended by the Mission were placed by a special purchase mission based by the Transport Secretary.

One of the important recommendations made by the U.K. Mission was that our port administrations should be strengthened by the appointment of General Managers to coordinate the activities of the heads of departments, thus relieving the Chairmen of the port trusts of routine administrative work and enabling them to give more time to important matters of policy. Such an officer designated as Director of Operations was appointed at Calcutta first. This experiment proved successful. A second in command was accordingly appointed at the port of Bombay with the designation of General Manager some months ago. Other ports will follow suit, if and when the need arises.

The second mission was an expert team sent by the World Bank and led by Mr. Posthuma, Chief Engineer of the Rotterdam Port Authority. The object of this deputation was to make an on-the-spot study of the development projects of the ports of Calcutta, Madras, Vizagapatam and Bombay. This was in connection with the application made by us to the Bank for a loan to cover the foreign

exchange component of the expenditure estimated at Rs. 40 crores in respect of the development schemes of these ports. Following the visit of this Mission and their report to the Bank, a team of officials consisting of the Secretary of the Transport Department, the Chairmen and Chief Engineers of the Calcutta and Madras Port Trusts and a Legal Adviser was deputed to the U.S.A to carry on negotiations with the Bank for the grant of loan to the above ports. As the members know, these negotiations were successful and agreements were executed on June 25, 1958, between the Bank and the two port authorities of Calcutta and Madras. The loans were for an amount of 29 million and 14 million Dollars in various foreign currencies to the two port authorities of Calcutta and Madras respectively. And the foreign exchange requirements of practically the entire development programmes of these two ports will be met by these loans.

The requirements of Bombay and Vizagapatam ports were not taken up for consideration by the Bank. The reason for excluding the Vizagapatam port was that it was not run by an independent statutory port authority but administered by the Central Government and as such the question of the Bank giving a loan to that port did not arise. I would, however, say that the provision of facilities for stepping up ore exports through Vizagapatam port will be covered by an aid of Rs. 2 crores from the U.S. President's Asian Development Fund. We hope to meet the balance of our requirements for Vizag from the free resources, meagre though they may be.

As regards Bombay, the main outlay is on two large schemes—dredging of the main harbour channel and the modernisation of the Prince's and Victoria docks. In the opinion of the World Bank Mission, these schemes were not ripe enough for the consideration of a loan from the Bank. We have asked the trustees to formulate and finalise their schemes quickly for presentation to the Bank.

Besides the other items of aid that I have mentioned we are securing foreign assistance to the extent of five million dollars for the purchase of two suction dredgers for Bombay port and three dredgers for catering to the dredging requirements of our new major port Kandla and of a selected number of minor ports. The first stage in the development of Kandla port comprising the construction of four cargo berths and allied facilities is practically over and we have taken up the construction of two additional berths for facilitating the export of the new-found ore from Rajasthan. The Cochin port administration, with its sound traditions of Harbour engineering, has made good headway with the execution of the schemes covered by the Plan and we are hopeful that almost the entire Plan programme of the port will be executed by the middle of 1960.

While making a study of our port development schemes, the World Bank Mission were satisfied that they had been conceived on the right lines. The Mission felt that the industrial activities in the hinter-land of Calcutta justified the construction of another major port in that region. You will be glad to know that Government have accepted this recommendation in principle and have initiated studies with a view to selecting the best possible site for the port. In these studies we are trying to enlist the services of two or three top-level technical experts under the UNTAA—one of them will be Mr. Posthuma himself.

As to our minor ports, about 230 in number, the Central Government have been giving the requisite financial assistance in the form of loans and high level technical advice. To cater to the requirements of additional ore export traffic and thus earn valuable foreign exchange, a few of the minor ports are being developed to the requisite standard. At the last meeting, it was decided that a high-level committee should be appointed with a view to selecting the more important of minor ports for intensive development in the Third Plan period. I am glad to announce that the Committee has been constituted and it will take up the question of intensive development of a few ports even in the Second Plan period.

When the works contemplated are executed, the port capacity can be expected to raise to the order of about 40 million tons in the aggregate. This will enable the ports to handle the volume of trade that passes through them without any difficulty and I do not share the apprehension, expressed in some quarters, that the planned port capacity would be inadequate to meet the country's expanding needs.

***

Here is a most powerful plea for associating businessmen at various stages of the Five Year Plans.

INDIA'S DEVELOPMENT WORKS

B. P. SINGH ROY

President, Federation of Indian Chambers of Commerce & Industry

India is one of the many countries in a capital-hungry world which require funds, and it is upto us, therefore, to make conditions attractive enough, both relatively and absolutely. In this connection, the various speeches made at the meetings of the International Monetary Fund and the World Bank, which took place in New Delhi last year are a pointer. Almost the recurring theme has been that since taxes are generally the greatest variable expenses of business, the lowering of taxes as an inducement to desired investment is one of the most potent incentives which Governments can offer.

Before I pass on to place before you some thoughts of mine on the place and role of private enterprise in India's developing economy, I should like to deal briefly with agricultural production. I fully share the view that desirable and urgent as industrial development is, the key to progress on this front also is agriculture. Unless we are able to increase the production of commercial and food crops, even our programmes of industrial development will be affected. Food prices have to be kept at a reasonable level in the interests of consumers and also because they have a bearing on the cost of industrial production. If we are to improve our exports also, the importance of agricultural production cannot be minimised. Direct exports of agricultural commodities currently constitute half of our total exports; the agricultural content of exported manufactures also consti-

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tutes nearly one-fifth of our total exports. Therefore, as much as 70 per cent of our export earnings are directly or indirectly secured from our agriculture. Another basic consideration, apart from the fact that ours is a predominantly agrarian economy, is the age-old hunger for land which has to be appeased, and towards this end various experiments are being tried in our country, such as, ceiling on land and the like.

The latest suggestion in the field of agriculture is the formation of agricultural co-operatives—production co-operatives and service co-operatives. Co-operation through compulsion has to be eschewed, and I have no doubt that such compulsion is far from the minds of the sponsors of the suggestion pertaining to the establishment of co-operatives. As, however, co-operative approach is desirable and on which I lay the greatest emphasis, I feel that there is scope for service co-operatives in the sense that short of joint production, people in the village may get together to obtain on a joint basis the technical knowhow and capital equipment. To my mind, four conditions must be ensured: (1) These service oo-operatives must be voluntary in character. (2) It will be wrong to launch upon an ambitious programme of having simultaneously or within a short time co-operatives in all our villages which number over 500,000. (3) An intensive educational campaign must first be undertaken. (4) Lastly, service co-operatives on a pilot basis must be formed, so that the villagers may come to know that such institutions yield better results. In other words, the spread and success of service co-operatives will depend upon the performance of the pilot ventures.

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Role of Private Enterprise

The first Plan, has been successful and the Second Plan, despite its difficulties, is on its way to success. The contribution of organised industry and trade is not unsubstantial. Studies of impartial bodies like the Tariff Commission and the Reserve Bank clearly show that whether judged by reference to meeting the needs of the consumers or building up the industrial potential or as providers of finance to the State, the part played by Indian industry and trade has not been inconsiderable. In spite of the various bottlenecks, there has been continuous rise in industrial production from 1951 onwards. The installed capacity of practically every industry—whether an old one or new one—has been rising every year. All the industries have shown very considerable accelerated progress as far as production and quality are concerned. Another remarkable achievement in the industrial sphere has been the comparative stability in the prices of manufactured goods notwithstanding the various internal and external pressures. In 1952, 43 industries have been enjoying protection when the Tariff Commission was constituted. The Commission has been reviewing the cases of these industries. Protection to 23 industries has been discontinued and protection to 17 new industries has been granted. Thus, this protection to industries has been in the nation's interest insofar as protection is not indefinitely continued—nor do the industries want such kind of protection. As the Reserve Bank Study of the finances of 1,001 Indian Joint Stock Companies for the year 1956 reveals, even in a year like 1956 when the incidence of taxation was less than it is to-day, a large part of the increase in the profits of the companies had accured to the Exchequer. The profits before taxation in respect of the 1,001 companies increased from Rs. 117 crorse in 1955

to Rs. 128 crores in 1956 showing an increase of about Rs. 11 crores, out of which provision for taxation accounted for a sizable rise of Rs. 8 crores.

The Federation is fully cognisant of the fact that the most central and dominant factor in our country to-day, is the marked awakening to consciousness of poverty and the demand for higher standards of material well-being and that it is in this context that plans for economic development have been conceived by our Government. Two Five-Year Plans have been formulated with other Plans to follow. We feel that our economic planning more specially because it is democratic, is not inconsistent with the continued existence of the private sector, nor is the extension of the public sector at certain points incompatible with the health of the private sector. We are convinced that the crucial test of whether or not Government intervention directly or indirectly in the economic field is in the interest of the nation is not merely how rapidly it increases employment or production, but how rapidly it builds up enterprise in the economic and commercial sense. In this view of things I submit on behalf of the Federation, that there can be no scope for arguments which might question either the wider role of State in an underdeveloped economy or the essentiality of private enterprise to ensure the growth of the economy at the various points, the basic purpose being increased production, increased consumption and standards of living together with increased and diversified employment.

Third Plan

It will not be out of place if I refer to the discussions, though of a tentative kind, that are taking place in regard to our Third Five-Year Plan. The Federation and its constituents are firmly convinced that India must move quickly in the march towards industrialisation which alone can meet the aspirations of the people to higher living standards. We strongly feel that the fact that the Second Five-Year Plan has run into some difficulties with regard to agricultural production, as well as shortage of foreign exchange should not deter us from learning from experience and drawing up an adequately sized plan. No doubt, the main burden of carrying out the programme of economic development on a massive scale must fall on the people of the country, Indian businessmen are prepared to share this burden. All we ask for is that we must be given sufficient opportunities and adequate facilities to contribute our best. I feel that Government and the Planning Commission must associate businessmen at the various stages of formulation of the Third Five-Year Plan, and the Planning Advisory Board, which for some reason is not functioning should be revived to activity. Let me assure that not only businessmen are anxious to participate fully in what is graphically described as the mighty adventure of building up the country, but they have the confidence that they can contribute to the self-accelerating process of economic development. ★

Magnificent Dams are constructed all over the country and the great use of giant tractors are brilliantly portrayed in this article by an eminent expert.

TRACTORS AND PROJECTS

M. R. S. NARAYAN

Larsen & Toubro Ltd., Madras

The First Five Year Plan was dedicated to self-sufficiency in food and the highest priority was devoted to the implementation of the "Grow More Food" campaign and to the rehabilitation of displaced persons throughout the country. Millions of acres of fallow and waste lands were brought under plow, townships sprang up in places which were once unapproachable jungles and shrubs, and river valley projects like Lower Bhavani, Tungabhadra, Gangapur, Hirakud, Damodar Valley, Bhakra Nangal, etc. already completed (and many more under construction) harnessed for irrigation and power the invaluable waters, which in the past were wasted into the seas.

Thanks to our country's natural resources, water, land, and sun, it was possible to solve our food problem : but let us review the important factors which contributed to this solution with such speed and economy.

Recent years have brought tremendous strides in the adoption of new construction techniques so necessary for the rapid development of modern highway system enabling quick and inexpensive transport of men and materials and for the harnessing of rivers for irrigation and power. Reclamation centres and river valley projects sites were in the past years, the scene of a round-the-clock battle against the growing food shortage. Large quantities of modern construction equipments were rushed to the selected areas. The mighty power of crawler bulldozers, giant earthmoving equipments like motorised scrapers and dumpers, enormous cranes and excavators and numerous other construction equipment were the chief tools of the campaign.

One man operated crawler tractors (the mobile power house) with different and specialised front and rear attachments handled with ease and speed varieties of jobs which by manual labour would have taken ages to accomplish. These modern constructiou machines were effectively used for :

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It has been proved beyond doubt that modern construction equipment is a " must " and indispensable for any development plan.

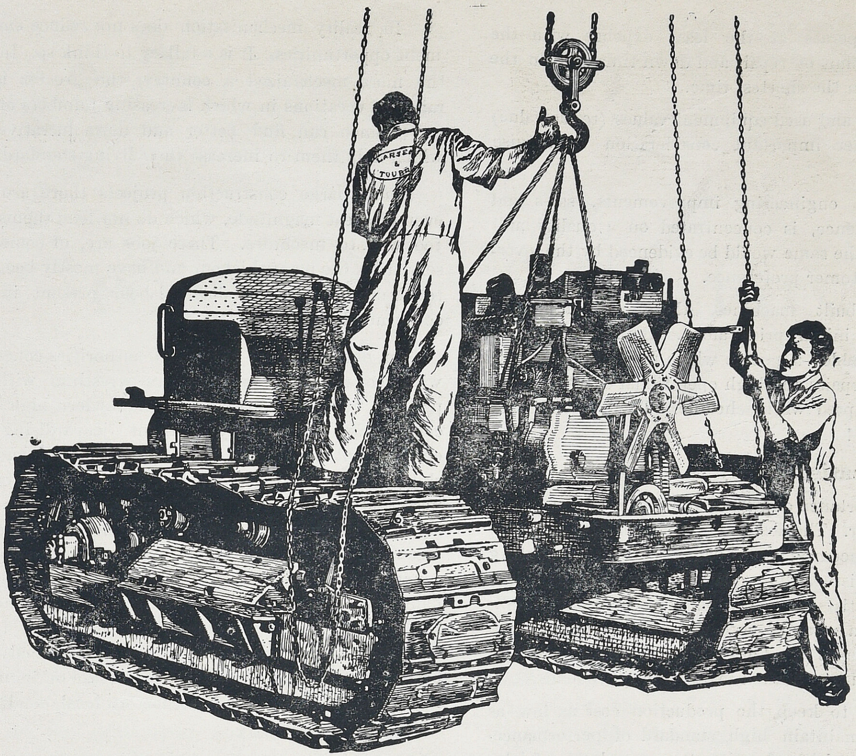
To an increasing degree, mechanisation is being introduced in every country, in all jobs. Construction of high dams and other projects of similar magnitude without modern equipments is certainly no child's play and the hazards involved unconceivable.

Selection of Construction Machinery

It is a natural tendency for many purchasing authorities to revert to low bid buying, as Rupee Comparison of bid price is certainly something tangible. Quality comparison however, even though it is of an intangible nature, has also far more to do with wise investment of the tax payers' money. In reality, the initial price is nothing more than a down payment on investment that is for the life of the machine. It is not a wise investment to buy the cheapest machine only to have more than the savings on initial cost dissipated in a year or two by repairs and high cost of operation.

The only true way of taking this intangible 'quality comparison' and developing it into a useful factor that will guide heavy equipment investment is by the use of accurate 'hourly owning and operating costs over the life of the machine. These expenditures are continuous and any expense in this direction—less or more—occur year after year. The accumulation of these savings or losses is immensely important. Therefore, a comparison of cost records on the actual working of the different makes of machines can be a means of practical comparison of the bid prices. Down time and high operating costs make clear the difference between price machines and quality machines.

In instances where cost records are not readily available, it may be a wise idea for a prospective buyer to visit some large projects-fleet owner and benefit by their job record costs. It is definitely a saving to buy quality built machines that hour after hour, year after



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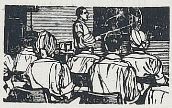

Special Training Courses. So far, over 400 men have undergone academic instruction and practical training in the operation, maintenance and repairing of machinery supplied by us. Special courses are also held to train customers' technical staff and, once a year, intensive training is given to Army Personnel in the operation and maintenance of tractors and heavy earth-moving equipment.

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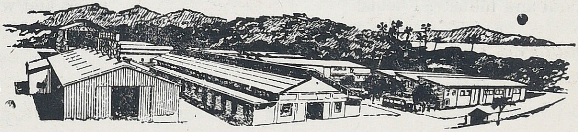

year, will operate at the least expense with the minimum amount of repair and down time and do the best job within the shortest time.

Long life and used equipment values (resale value) is also another important consideration in a wise selection.

Research, engineering improvements, sales and service experience, is concentrated on a quality built machine and the same would be evidenced by the overwhelming customer preference.

Quality built machines, therefore, cannot be measured by initial price alone. Buying strictly on price is a gamble—a gamble which may cost thousands of rupees in repairs and high operational cost and much more in disrupted work schedule. The best bid is not always lowest !

Standardisation

The importance of standardisation is recognised all the world over. The absence of a master plan for plant planning, 'peacemeal' and 'panic' purchase, accepting lowest bids disregarding quality, often leads a project to a very unsatisfactory position, confusion, and inefficiency—with a heavy inventory of plant and machinery of different makes (good and bad) and sizes (small and big) which cause unlimited maintenance problems.

In order to keep the production cost as low as possible, to maintain high standard of performance, and to ensure quick and satisfactory completion of jobs, it is most essential for any projebt to standardise on one or two well-known and proved makes which are backed by efficient after-sales-service.

Man vs. Machines :

It is, however, often said and believed that machines deprive men and women of employment especially in a country like ours where inexpensive labour is available in plenty. However, while it is true that skilled and unskilled labour would gain if the big jobs are done by manual labour (what one big earthmoving machine of 30 cu. yds. could be accomplished will roughly require an army of 400 men), it is equally true that *the delay of several years* in the completion of the projects will itself seal the doors of opportunity of increased production and employment both in agricultural and industrial fields.

In reality mechanisation does not reduce employment opportunities. It is a fallacy to think so. In fact, the more mechanized a country, the greater is the range of vocations in which increasing numbers of men and women can find better and more lucrative jobs which help them to increase their living standards.

In all large construction projects there are jobs, even of great magnitude, which do not lend themselves too well to machines. These jobs are, of course, reserved for the manual labour and have mostly been able to absorb whatever available labour present in the concerned locality.

In every part of the world, authorities concerned with construction projects are wrestling with the problem of how best to utilise the modern high speed construction machinery without jeopardising the employment chances of the available skilled and unskilled labour. In our country, because of the cheapness and plentifulness of labour, it is expedient to compromise by adopting only partial mechanisation by means of labour saving machinery which is a popular course in the interest of all concerned. When high dams, water ways, highways, etc. are urgently needed for increasing food production and hastening industrial development, it is very important to analyse all economic factors and to decide each case on its merits having due regard to the time factor, local conditions, and available finance.

Conclusion

Though we are *new* to the field, nothing prevents us from benefiting on the experience gained by countries which are more developed in Industrial and economic spheres.

We have to increase the standard of living of our people which can be achieved only by finding ways and means of fully utilising our vast resources and mineral wealth as yet unexploited. The prospects for our progress and expansions are indeed immense.

Thanks to the Almighty, we have enough men, material and resources and what we now need is *right thinking, concentrated and unified efforts with determination for the onward march.* The success of any enterprise depends upon the character, ability, spirit and will of its people and leadership. ***

This great South Indian Industrialist makes a masterly survey of the banking history of our country.

ECONOMIC CO-OPERATION

M. CT. MUTHIAH

Chairman, The Indian Overseas Bank Ltd., Madras

The year 1958 may pass as a unique one in post-war era. Certain economic ideas that have been developing over the past decade have found fuller expression that the economic prosperity of the world is indivisible and that necessary attention should be paid to the improvement in the living standards of the under-developed countries to sustain the output of the developed countries themselves. The twins of Bretton Woods, the International Monetary Fund and the International Bank of Reconstruction and Development, who have set the pace of correct international monetary thought and economic development, have given concrete expression to these growing ideas by their decision to enlarge their resources, so that their service mainly in the direction of the under-developed world will not be fettered for want of resources.

The annual meeting of the International Monetary Fund, International Bank of Reconstruction and International Financial Corporation held for the first time in New Delhi last year drew attention to the necessity of improving the standards of the people in underdeveloped countries, while also emphasising the obligations which these countries have to observe to attract foreign capital and assistance. I need not add that foreign opinion is alive to the needs and aspirations of India and our sacrifices for the success of the Plan have indeed met with appreciation abroad.

The same appreciation of India's position characterised the Washington meeting in August of the U.S.A., U.K., Germany and Japan under the aegis of the World Bank, which decided in principle to provide the requisite foreign exchange resources for carrying through India's requirements till March, and agreed to assemble again to discuss India's further needs through the succeeding two years of the Five-year plan. The plan target itself was revised twice in the context of foreseeable resources, and the Government of India spared no measures to reduce the gap in our foreign exchange position.

Casting a glance backwards over the last year, I must mention about the stress and the strain that persist over the economy of our country. The public are painfully aware that the cost of living has risen at a very fast pace which is more than ever widely attributed to the scale of deficit financing. The higher prices are a symptom of an old and familiar

inflation which still remains to be tackled effectively and the promises regarding safeguards now seem to belong to history. I will not hesitate to say that taxation is not the right remedy because one finds that an increasing share in the national income is being absorbed by the Government. It is a common desire of all to fight the forces of inflation by raising the output in industry and agriculture alike and that our domestic policy should aim at stabilising the prices and wages at satisfactory levels.

The competition of two major steel plants this year is one of the important land-marks in the progress of the Second Plan which in spite of its re-appraisal has not suffered serious pruning on account of the determined efforts made by the Government and the public to mobilise all the resources and assistance offered by friendly nations.

In Madras State, progress has been made in irrigation and power development to permit the feeling that plan outlay has attained good results and that there will be no faltering in the pace of Industrial Development. Major industries have been inaugurated in the South and the project taking shape at Neiveli offers an assurance of success to potential industries like aluminium and pig iron.

There can be no argument over the Government's desire that the Third Plan should be bigger than the second so as to maintain the tempo of economic development. But the experience gained in the Second Plan and the economic situation as disclosed in the recent budgets should provoke serious rethinking and it is most important to zealously guard against any decline in the value of our currency since it is absolutely necessary to preserve the high reputation that the rupee enjoys as a sound currency in the world.

The outstanding event in the history of banking in India is the Inter-Bank agreement on deposit rates, which became effective from October last. Most of the leading banks have joined this agreement as a result of which unhealthy competition and rate-war have more or less ceased to exist. I wish this will open out possibilities of an agreement being reached on other items such as charges and rates for various kinds of business, based on evaluation of cost, so that the Banking industry will be saved from an uneconomic rate structure.

The free flow of funds into the banking system that started in 1957 had continued unabated and over the year, the resources of the Scheduled Banks rose by Rs. 206 crores to Rs. 1,574 crores while the volume of credit registered a small rise of Rs. 8.5 crores only as against Rs. 70 crores in the previous year. This enabled banks to raise their investments in Government securities from Rs. 433 crores to Rs. 637 crores. A significant feature in the monetary situation during the year was the decline in the rate of increase in money suppy. While in 1957 the increase was Rs. 96·3 crores, it dropped to Rs. 74.9 crores in 1958.

The Personal Loan Scheme recently introduced by our Bank breaks fresh ground and seeks to extend banking service to a wide sector of people hitherto largely outside its fold. It enables the lower or the middle class man to possess a variety of durable goods, such as bycycles, sewing machines, radios, electric fans, refrigerators, scooters, motor cycles, furniture, etc., which are essential but outside his reach owing to the difficulty of finding a lump sum for cash purchase. This would mean increased offtake which will provide the requisite incentive for growth of indigenous industries and this way consumer credit will be a factor towards a balanced economy. Such schemes have made considerable headway in the U.S.A., and last year, the lifting of the "credit-squeeze" in the U.K. opened the way for some English banks to launch similar schemes with notable success. In India, our scheme has been widely welcomed as satisfying an essential need. There has been some reference to the possible inflationary effect on the price level but, even so, if the scheme is so administered as to promote consumption of essential articles which are not in short supply, it would be in the national interest to do so. I have no doubt that if the scheme is rightly administered, it should prove a success in India as elsewhere. ★

Almost all industries depend on this vital industry. Shri Kamani makes an illuminating survey.

INDIAN NON-FERROUS METALS INDUSTRY

P. R. KAMANI

Industrialist, Bombay

The contribution of the non-ferrous metals industry to the saving of foreign exchange has been outstanding and apart from the fact that currently raw materials themselves are subject to licencing and are thus pruned to actual requirements, considerable saving has been effected by stepping up indigenous production of stores that had hitherto been imported.

This is an industry whose achievements are not visibly known, but almost every industry, including communications, depends directly or indirectly on us, and is fed by our semis, alloys and manufactures. We have thus extended our field of service to almost all walks of economic and domestic life in India of which we can be justifiably proud. We are still progressing and making efforts to save as much foreign exchange as possible, while adding to the earnings of Indian labour and raising the national wealth.

Import of Raw Materials

The semi-manufacturing section of our industry as also the alloying and the casting sections depend still on a considerable quantity of imported virgin metals and scrap in their activities and as such they did have a difficult period, immediately after September, 1957, when non-ferrous metals which were since 1950 under O. G. L., were brought under licencing.

After passing through an extremely difficult interim period of almost 6 months, the Government have recently announced their new import policy in terms of which consumer licences would be issued to Actual Users for the import of non-ferrous metals. This facility has come after a great deal of anxiety experienced by us and pursuant to several discussions and representations which we had to the

Government. In fact, while prices did show some spurt in regard to raw materials the sheet rollers of copper and brass did effect cuts in regard to some types of sheets manufactured by them where they were able to afford a price adjustment, and thus fully responded to the appeal made by Government for holding the priceline. This is an initiative which we shall maintain in the future as well.

There is only one observation which I would desire to make still in respect of current licencing of raw materials and that is that conversion facilities be allowed in respect of import licences and that licences issued for copper scrap be allowed for the import of ingot and similarly those issued for copper ingot for the import of copper scrap wherever the licences are used by Actual Users. This facility would be of help, particularly to the alloy makers who might some times find that scrap is available to them at cheaper rates than virgin metal and that by utilising copper scrap they would be able to bring into the country a better tonnage of metal and step up production more than by bringing copper in virgin form.

The Government have paid considerable attention to develop steel, Hydro Electric Power, Fertiliser and other projects and we shall be fortunate to see the good results of the same in coming years. Unfortunately, however, it seems that deserved attention has not been paid to the prospecting and mining of non-ferrous metals, which is a basic industry. We spend exchange to the tune of 30 crores of rupees for imports of non ferrous metals and metal products. Besides, they are strategic metals.

In my opinion, prospecting and mining is a kind of speculative enterprise and is extremely hazardous and difficult to carry on without adequate Government aid. I would therefore suggest that the Government creates a Corporation—an autonomous body—whose work would be to do the prospecting of mines and when they prove to be worth commercial exploitation, pass them on to private enterprise, charging expenses incurred, or sharing in the company to the extent of such expenses. I may add that even in a highly industrialised country like America the Government have contracted for offtake of copper for 10 to 15 years at guaranteed rates, which are much higher than market prices, from copper producers in order to encourage opening of new mines. In our country, therefore, some incentives as indicated are necessary.

Import of Products and Stepping up Exports

In regard to import of semi-manufactures and alloys, we do not have cause for dissatisfaction about the current policy and have occasionally ourselves recommended the import of items vitally needed by industrial consumers but not yet manufactured in the country as extruded tower bolt sections of the split base type for making tower bolts, monel pop rivets etc. There should, however, be no justification for import of things made in India in satisfactory quantity and quality or for sealing off manufacturing capacity in any of these.

The other aspect of our Foreign exchange problem is the stepping up of exports. For an Industry like ours it might appear at first sight that there is not any substantial contribution that we could make here but exports of non-ferrous metals, residues and products have reached during 1957 a sum of Rs. 1,62,51,747/-.

In this connection, it would not be out of place to mention that the present Export Promotion Scheme which entitles the Exporter to an import licence for raw materials to the extent of 75% only after the export is effected. In my humble opinion, greater incentive for export of non-ferrous semis could be provided by working out an Export Promotion Scheme under which facilities similar to those offered under Part I of the Scheme such as Advance Import Licence for raw materials etc. could be given. This is very necessary because of very rapid fluctuation in international prices of copper and other metals. If raw materials are

covered after the export is made, the exporter is likely to incur heavy losses and so the industry is hesitant to plunge into exports of non-ferrous manufactured items.

We are earnestly trying to survey export possibilities in adjacent markets as in terms of current export policy copper base alloys, aluminium collapsible tubes, semi manufactures of copper, brass and aluminium as also conductors, winding wires and cables are permissible to be exported.

It is perhaps likely, at a future date, that even export of virgin metal may not be ruled out. For a net importing country in metals as India, the export of virgin metals might appear an unreasonable proposition at first sight, but if a healthy and well developed metal market were to emerge in India facilitating free inflow and outflow of metals even this might not be an unrealistic proposition and might, in effect serve as an unofficial stockpile for the country.

Production and Production Impediments

With the limitations explained earlier on the import of raw materials into the country, the production already reached by the industry in its different sectors must be considered extremely satisfactory. Among products that are expected to improve on their production records in 1958, are virgin aluminium, virgin antimony, sheets, strips and circles of aluminium, brass, copper and zinc; rods, extrusions and sections of aluminium, brass and copper; aluminium foils, V. I. R. cables, winding wires and the different types of non-ferrous alloys and castings. In many of these, production improvements have been substantial, as might be noticed from the production charts which we have displayed at exhibitions. It is only in a very few items such as aluminium wire rods, A.A.C. and A.C.S.R, Hard drawn bare copper conductors, pipes and tubes of brass, copper and lead that production improvement is insignificant or there has been any noticeable decline in production. These are explained by power shortage, seasonal decline in demand, temporary factory closure due to labour troubles or overhaul and other such factors. The production of virgin copper and lead, while expected to be falling short slightly of last year's achievements, may yet be regarded as very satisfactory as the production of last year's was about the highest during the last five years and the smelters have had same dislocation at their works in certain parts of this year. These production records that have been reached in the semi manufacturing section or in alloys and castings are remarkable having regard to the depletion of stocks of raw materials in the country closely following on the introduction of licencing.

The problem of idle capacity does, however, exist in some fields of production in the light of which a matter of some concern to us is that the development of manufacturing capacity in the cottage sector of the industry goes on thoroughly uncontrolled while extensions in the organised sector are entirely regulated. I should not be understood as being unappreciative of the role of cottage industries in the country's economy but my point would be that while expansion in the organised sector of industry is controlled and regulated by the Industries (Development and Regulation) Act, those who start as cottage industries have the facility to ask for de facto registration subsequently by presenting the Government with a fait accompli. I would also take this opportunity to request my fellow Industrialists to realise that we, in turn, should achieve better progress if we adjust to circumstances and suit our activities to the requirements of the country so as to make it self sufficient. As most of us have laboratories, research arrangements, adequate technical personnel, we can, if necessary, even have technical tie-up with foreign firms. It is therefore in the interest of the industry and of the country as a whole that we try and conquer production of newer items which are now being imported and leave the usual routine products to cottage and non-scheduled industrial units. I believe we should follow to a greater extent the pattern of industry in Japan and work in co-operation

with the small scale industry. I know it is rather difficult to be convinced of this but if the matter is given calm thought, it will prove of great advantage, in the long run.

It would also be advisable, to facilitate this, that even before any order for stores presumed not obtainable in India are crossmandated abroad, the tenders are publicised in India and that such publicity is not done only subsequent to such cross-mandating of order itself.

Recent Development

It might perhaps be proper to mention in some detail the recent progress which is noticeable in the several sectors of our industry apart from increase in output itself mentioned earlier. The idea of an electrolytic copper refinery is no longer a wishful prospect but a practical proposition and it is hoped that at least one refinery with 8000 tons of annual capacity might go into production by the end of 1961 if plans work according to schedule. Efforts are afoot for supplementing this by more units and the problem of inadequate resource of copper ore which has always been present with us might, if recent reports be true, be solved to a considerable extent by the prospects opened out at the Khetri mines. Besides this, another extrusion press for semis, which will cater for the increased requirements of rods and tubes, will shortly go into production. I am also glad to inform you that a further strip mill for industrial quality strips is also going to be put up in the near future in order to cater to the industrial requirements of strips up to 46 SWG. It will also now be possible to produce groved wires and catenary wires required for Railway Electrification as the necessary equipments have arrived. This is really commendable progress.

In regard to virgin aluminium our target for the Second Plan period was 30,000 tons of which the expansion schemes under way must alone carry production capacity to 17,500 tons immediately and eventually to 20,000 tons. The smelter which is being put up at Hirakud, initially proposed for 10,000 tons could, it is understood, be stepped up very easily to 20,000 while exploratory talks have been going on for the installation of a fourth smelter at the initiative of private industry in another part of North India. The reports about a ten thousand ton Aluminium smelter to be established in the Bombay State which would use Koyna Power are also welcome to the industry.

The production of virgin lead and zinc has also made satisfactory progress and hopes of an indigenous zinc smelter for refining the zinc concentrates currently exported are now nearer of achievement. Antimony refining, which came to depend on imported ores since partition of the country, promises again to be on its feet with the reported location of new deposits in the State of Madhya Pradesh. I do hope that the existing refinery will have the first chance to work the deposits, linking up their smelter operations to an indigenous source of ore supply once again. Many of these developments have been rendered possible by the Government's sense of expediency and resilience while implementing their industrial policy resolution, which has enabled existing units in the industry to go ahead and I have no doubt that this same approach will inspire our future plan as well.

An important branch of the industry which is presently coming up before the Tariff Commission for protection for the first time is lead and zinc. The decline of world prices in these metals combined with the fact that the existing producers fail to make both ends meet on the present basis of exporting their zinc concentrates for treatment abroad, besides the financial requirements of the industry for the establishment of a Zinc Smelter, demand that the problem of protection to it is fairly immediate. There is no doubt at the same time that the burden falling on the consumer from this step should be the minimum possible and from an examination we have made of this position there might practicably be no alternative to subsidising this industry from general revenues until their operations should be placed at an economic level. The lead and zinc industry are vital to us and with the recent restriction on selling faced by Australia in the American market they should expect a further drop in price and therefore more severe competition than hitherto. I am sure, these problems would receive the earnest consideration of the Tariff Commission, in its forthcoming enquiry.

Other significant expansions which have taken place in the industry are in the production of certain aluminium alloys, pressure valves and castings, industrial sheets of copper and brass etc. There is going to be a further increase in capacity in the production of A.C.S.R. where some new licences have been issued. In keeping, therefore, with the vast progress of industrialisation under the Five Year Plans, it is clear that our own industry is also making adequate headway.

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In this powerful sketch, a great authority on Road transport pleads for more facilities.

ROAD TRANSPORT

R. G. SARAIYA

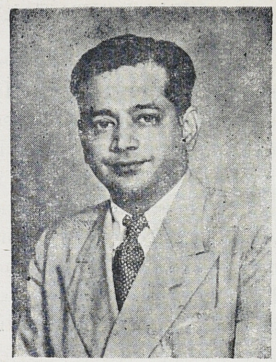
Chairman, B. S. R. T. Corporation, Bombay

In a Development Economy like that of India the importance of road transport and communications needs no emphasis. Without arguing as to whether road transport forms the core of the Plan or the hard core of the Plan or the foundation of the Plan, it would be correct to mention that there could be no plan of national development without road transport being an integral part of it. Road transport alone can provide the markets for the products of agriculture and industry and prevent surpluses accumulating in the centres of production and scarcities developing in the regions of consumption. While Railways certainly play an important part in meeting the transport needs of the country, there is no difference of opinion as to the need for the development of road transport at the same time. The Railways by themselves cannot carry all the traffic either of passengers or of goods nor can they reach every village in the country. This need has been well recognised by the Government of India. Shri Raj Bahadur, Minister of State for Transport and Communications in India, recently while inaugurating the Seventh All India Conference of State Transport Undertakings, said, "Road Transport has indeed demonstrated its superiority over other modes of transport as a carrier of goods and men and I have no hesitation in saying that if we want speed, efficiency, economy in overall cost and fuller utilisation of the available resources in the matter of transport, we must divert greater funds and attention to its development". He then went on to

say "in these circumstances it also seems imperative that the present allotment of roughly Rs. 50 crores per year for the development of roads should be considerably increased. The Indian Roads Congress, during their recent Annual Session, recommended an outlay of Rs. 80 crores in 1961—62 and an increase over this of nearly Rs. 19 crores every year subsequently. Keeping in view the needs of rural areas, even this appears to be somewhat modest". It is, however unfortunately that in the wake of this official recognition some members of the Railway Board should have chosen to express concern over the diversion of goods traffic to road transport as a result of which the Railways incurred heavy losses, implying thereby that road transport would have to be further regulated. The restrictions under which road transport has been working since 1939 are well known. It was because of the growing awareness of the shortage of transport facilities and the need to expand them that the Motor Vehicles Act was thoroughly revised at the end of 1956. Last year, the Government of India appointed a Committee under the Chairmanship of M. R. Masani, M. P., to make recommendations for the re-organisation of the transport administrative set-up in the States. This Committee has recently signed its report, and I trust that it will have shown the way to the removal of at least some of the many difficulties and handicaps that hamper road transport.

To my mind, the customer must be able to choose his form of transport and there would be a healthy rivalry between the various forms of transport so as to provide the maximum facilities to the public. The way to assist one form of transport is certainly not by handicapping another form of transport. In this connection I would like to make a special appeal for greater emphasis on road development during the remaining years of the Second Five Year Plan and also the Third Five Year Plan in view of the following important considerations. The construction of roads requires a very small proportion of foreign exchange. There is already evident in the country a surplus capacity in the production of cement. Road building also provides considerable employment to the people, and at the same time helps the rural areas by creating markets for their produce. Road Transport is a good earner of revenue for the Central and State Government. I need no apology to quote Shri Raj Bahadur again: "In 1956—57 the year for which figures are readily available, the total revenue yield from road transport was Rs. 89.44 crores for a capital investment of barely Rs. 500 crores. Substracting from this the expenditure incurred on maintenance of roads during that year, the net yield comes to Rs. 65.81 crores. Against this, just to take one instance, the Railways for the same year contributed only Rs. 36 crores to the General Revenues for a capital investment of Rs. 1032.: crores. Road transport also possessses greater employment potential than the railways and at the same time it creates and keeps going many ancillary industries, further increasing employment opportunities for our people".

Apart from the provision of roads, the most important question is the supply trained personnel to operate the motor vehicles which are required for the provision of transport on the road-services like automobile engineering repair facilities, petrol and diesel oil pumps, supply of spare parts and accessories like batteries, tyres and tubes and hundreds of other articles which go into the production of a transport vehicle. The importance of trained staff in industry has beem emphasised again and again by the Government of India. In this context, it is gratifying to note that the National Productivity Council have sponsored the visit of a team of transport officers and experts to the U.S.A. and other countries with the assistance of the international Co-operation Administration and other Funds. I am sure that this team will provide valuable guidance for the more effective utilisation of transport vehicles and equipment in this country. ***



In this enchanting industry, the colours of the rainbow are captured in a thread. Shri Ramanathan's account makes it more bewitching.

RAYON AND CELLULOSE FILM INDUSTRY

A. R. RAMANATHAN

Chairman, Travancore Rayons Limited, Rayonpuram

The development of rayon is an interesting marvel of industrial research. The industry originated in France in 1895 and its development has been most rapid during the last three decades. Today, rayon has won a major place in the economy of almost every Nation in the World. The range of types and qualities is increasing at a tremendous speed, while, comparatively, that of the natural fibres remain substantially unchanged. The Second World War has speeded up new technological developments and we now see considerable improvements in the methods of production, processing, and utilisation of rayon. The versatility of rayon is remarkable. It can be made into a thread or yarn with continuous filaments, or it may be spun as a heavy tow of fine filaments, then cut to any desired length for processing on cotton, wool or worsted machinery. The individual filaments could be very fine—finer than the finest hair—even finer than the filament spun by a small spider—or as coarse as horse hair. Then again, these fibres can be made shiny bright or chalky dull or mixed and blended with natural fibres to produce other novel effects. The process involved in the manufacture of viscose rayon are briefly as follows :

Steeping and Shredding

The wood pulp (generally in sheet form) is stored in a specially conditioned room so as to gain a uniform standard moisture content. A definite weight of sheet pulp is steeped in dilute caustic soda solution of approximately 17·5 per cent strength, for a period of about two hours. The pulp sheets absorb caustic soda freely, becoming alkali—cellulose. The sheets swell a good deal in the process and they are then pressed to a definite weight and the excess caustic soda is also eliminated in the pressing process. The alkali-cellulose sheets are then conveyed through the knead-

ing machine. The Centrifugal mill is fitted with a cooling jacket and is controlled at a fixed temperature. The kneading operation has also to be carried out at a determined and uniform temperature. When passing through the kneading machine, the pulp is thoroughly agitated and disintegrated (' Shredded ') into snow white flocks technically called (' crumbs ').

Maturing

The crumbs are then discharged into metal containers known as maturing trucks. The maturing trucks have air spaces between them, which facilitate temperature control during the maturing process. The maturing trucks are taken on a tramway to the maturing room. The maturing room is insulated and the passage of air is controlled, in and about the maturing trucks. The temperature of the room is thermostatically controlled and is kept uniform during the maturing period, which may range from 48 to 72 hours. The process is one of equalisation, and chemical action is very slight. Inasmuch as the quality and viscosity of the ultimate spinning solution are materially affected, uniform and perfect maturing is essential to ensure the quality of the final product.

Churning, Mixing and Dissolving

Churning is the next operation. The crumbs of alkali—cellulose are here treated with carbon disulphide (in spray form) in measured quantities, forming sodium cellulose xanthate. The alkali—cellulose crumbs are rotated in cylindrical steel drums. The main cylinder is water or brine-jacketed. The chemical reaction inside the churn takes about 2 1/2 to 2 3/4 hours, and in the process the crumbs gradually turn from white to yellow and then to orange. To enable the operator to observe the colour transition, the churn is fitted with a window. The churn is also provided with thermometer to enable temperature control. When this churning operation is complete, the treated crumbs (sodium cellulose xanthate) become soluble in caustic soda. In this dissolving process, large mixtures are used and complete dispersal of cellulose in caustic soda is obtained. The resultant orange solution is called ' Viscose '. The modern machine used for the dissolving process is the turbine mixer. The body of the mixer is jacketed and coupled to a cooling system. The working temperature of the viscose solution is controlled.

Blending and Ripening

The viscose solution is then discharged into enclosed cylindrical vessels and the liquid kept in circulation by means of a pump. The temperature here again is controlled by a water jacket. The blended viscose solution is then passed through filter chambers and presses, and then into ripening tanks. The ripening room temperature is carefully controlled. The time taken for ripening is about 2 1/2 to 3 days. Vacuum is applied to the liquid before use in the spinning machine in order to remove any air bubbles.

Spinning

The viscose solution is fed to the spinning machine under pressure, and there it is pumped through very fine jets or spinnerets, into a coagulating bath containing acid and mineral salts. The viscose solution is decomposed, the cellulose is regenerated and the jets of liquid viscose are converted into fine filaments. The coagulating thread thus produced is collected in a centrifugal box known as ' Topham Box '. This box rotates rapidly on a verticle spindle and the yarn is therein cross-wound in the form of a cake, the required amount of twist being imparted by the rotation of the box. The yarn is then subjected to the subsequent process, known as ' After-treatment ', where the yarn is washed, desulphurised, bleached, softened and finally dried and conditioned to the required moisture

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content, bringing into existence the pure regenerated fibre in its real lustre and beauty.

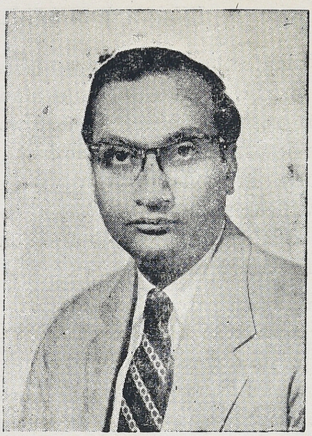
The rayon industry in this country is one of the major post-war industries. Although substantial quantities of Art Silk Fabrics were being manufactured in India since two decades ago, all the yarn required was being imported from foreign countries. The weaving industry was, thus, entirely dependent on outside sources with the consequent uncertainties and instability. It was World War II which focussed serious attention on this precarious handicap. The need for establishing indigenous sources of yarn supply was keenly felt and steps were taken to bring into being rayon yarn manufacturing units.

Travancore-Cochin State enjoys the distinction of possessing the first rayon factory in the whole of South Asia. The Travancore Rayons Ltd., the pioneer enterprise which brought this credit to the State, was established in 1946—sponsored by the enterprising and talented businessman, the late Mr. M. Ct. M. Chidambaram Chettiar, in active collaboration with the progressive State Government. Then followed the National Rayon Corporation Limited, Bombay. The third one is the Sir Silk Limited, Hyderabad. The first two produce rayon by the viscose process, while the third one has chosen the acetate process.

The rayon industry in India has achieved considerable success even during its short span of life so far. The quality of production has been quite good, bearing favourable comparison with the imported brands in regard to all aspects — lustre, fineness, uniformity, strength, etc. A steady and competitive price-level has also been maintained. The prices for the various deniers and qualities have been parceptibly cheaper than the landed cost of imported yarn in many cases.

Encouraged by the sympathetic assistance of the Government and with a view to fulfil the target fixed for the rayon industry under the First Five-Year Plan, the two older units, The Travancore Rayons Ltd., and the National Rayon Corporation Ltd., have embarked upon ambitious expansion schemes. The industries are also having long-range plans, by which, ultimately, complete national self-sufficiency in the matter of rayon yarn could be achieved.

In line with the popularity which rayon has gained in other advanced countries, in India too this wonderful man-made fibre has worked its way up remarkably. As compared with about a thousand power looms which were engaged in weaving imported rayon yarn in India about two decades ago, we have now over 25,000 power looms and 75,000 handlooms. With proper co-ordination between the rayon spinning and weaving industry and a judiciously balanced Government policy, the scope for profitable development is bright. The policy adopted by the Government of India in regard to imports of rayon yarn during the last few years has evinced a stimulating appreciation of striking a realistic balance between the various interests involved. It is hoped that such appreciation will continue to prevail, in the interest of adequate protection to the indigenous industry. Of the main raw materials required for the industry, sulphuric acid and rayon grade caustic soda are now being manufactured within the country. In regard to wood pulp alone, we have to depend solely on imports. Ways and means of eliminating this dependence need exploration by the Government. The manufacturing of suitable wood pulp from indigenous sources has been accepted as a possibility and the steps necessary to make this a *fait accompli* should receive the earnest and urgent attention of the Government. ★



After a decade of tremendous hardships this vital industry is blooming into an export industry. Shri Birla makes a masterly and illuminating survey.

INDIAN TEXTILE MACHINERY INDUSTRY

K. K. BIRLA

Chairman, Texmaco, Calcutta

The textile industry is the biggest industry in this country. It employs 8,00,000 workers. Its production per year is about Rs. 400 crores. Its importance can be judged from the fact that of the total industrial output of about Rs. 1100 crores this industry accounts for Rs. 400 crores. Thus the textile industry accounts for more than one-third of the total industrial production of the country. It is not only the most important Industry in the country but occupies a very prominent place amongst the textile producing industries of the World. As a matter of fact, from the point of view of cloth production, India occupies a place second only to the United States.

It is a matter of disappointment that in spite of the textile industry being the biggest and oldest industry in this country, no appreciable headway was made towards the manufacture of textile machinery in this country until World War II. A beginning was made towards the repairs and maintenance of the installed machinery in the mills, and workshops were started for this purpose in Bombay and Ahmedabad just after the cessation of hostilities in 1918. This nascent industry naturally got support from the textile mills. Some time between 1925 and 1930 machine-cut wheels began to be manufactured. This was regarded as no mean achievement and was acclaimed as a big event for the industry. Those who had the gear cutting machines prided themselves on the quality of their manufacture. The support from the

local and upcountry mills increased the number of factories producing these parts. A lead was given in this direction by Ahmedabad and it is to the inspiration drawn from these pioneers as also from the pioneers of the textile industry that the Textile Machinery Industry owes its birth.

There appear to be two reasons why the manufacture of textile machinery in the true sense could not be started in India earlier than the Second World War. One was lack of technical know-how. Engineering industries somehow or the other have always failed to attract due patronage from Indian industrialists. There was always an apprehension that in the absence of technical know-how they would not be able to manufacture capital goods successfully. The second reason was that there was always a fear of foreign competition hanging like Damocles' sword over those who undertook this venture. As it is, the manufacture of textile machinery in India on an appreciable scale was begun just before the Second World War. The products first chosen for manufacture were spinning ringframes and looms. The manufacturing operations had just started when they were interrupted by the advent of the Second World War. Most of the machine shops of repute in the country were then directed to switch over to the manufacture of war material. Permission, however, was granted for the manufacture of looms. Their production was started in the country along with some sundry machines.

Soon after the cessation of hostilities, civilian production was resumed and the first ringframes ever to be produced in this country came out of the shops some time in the year 1946.

More concerns manufacturing textile machinery soon sprang up in different parts of the country. Two concerns were started to manufacture ringframes and other machinery at Coimbatore. Of these, one has made commendable progress. Another concern was started for the manufacture of textile machinery in Bombay in collaboration with a foreign firm. A firm in Calcutta undertook the manufacture of carding engines on the pattern of American machines.

By the year 1948 a capacity to manufacture 382 ringframes was established. The actual production, however, was low owing to paucity of orders and local prejudice. These pioneers in the manufacture of textile machinery had to labour very hard to establish themselves and to overcome the natural prejudice against the firest local products. A great deal of sales advertisement and a number of physical demonstrations were held before confidence could be established regarding the quality of local products. In many cases, goods were even sold on credit and with sufficient guarantees about their performance.

As to the manufacture of looms, although a beginning was made as early as 1936, no appreciable progress could be made towards steady production owing to lack of demand, local prejudice and the outbreak of war. By 1946, however, production had reached 1400 looms and by 1948 it exceeded 2600 looms. The production, however, was still low compared to the capacity which was 5390 looms per year.

The quality of the first products was not up to the standard of imported goods. It was, however, also not so unsatisfactory as to discourage the producers outright. It was in fact quite a good effort on the part of the promoters of textile machinery manufacture. Gradually, however, the quality went on improving, thereby mitigating local prejudice.

The first Tariff enquiry into the affairs of the textile machinery industry was held in 1947. No concrete results were arrived at in

that enquiry as the textile machinery industry was still in a nebulous state.

In the year 1949, however, the first enquiry of importance was held. This was attended to by the representatives of the textile industry as well as those of the textile machinery industry. On the recommendations of the Tariff Board, the Government of India introduced a protective duty of 10% ad valorem on the import of spinning frames and plain looms. This protection has been continuing since then. Such provision of protective duty was, however, in name only, as in actual practice what had happened was that the import duty was converted to a protective duty.

By 1954 when another enquiry was held by the Tariff Board, the installed capacity for ringframes had increased to 672 and the production had been as under :

1950	186
1951	307
1952	303
1953	215

As to looms, the installed capacity had increased in 1954 to 6640 and the production was as under :

1950	2059
1951	2576
1952	1633
1953	1932

A beginning was also made towards the manufacture of automatic looms in the year 1951. There is yet only one unit in this conntry producing automatic looms.

As to carding engines, production commenced in 1951 and had increased to 600 by 1955.

The three major items that have been produced in this country as mentioned above are ringframes, looms and carding engines. Besides this, production has also begun in respect of draw frames, flyframes and reeling machines.

The targets of capacities for the Second Five-Year plan are as under :

Ringframes	1896
Looms	4980
Carding Engines	1692
Fly Frames	168
Drawing Frames	84

The actual production against these is as under :

Ringframes	1116	(1956)
Looms	2787	(1955)
Carding Engines	732	(1556)
Fly Frames	13	(1954)
Drawing Frames	16	(1954)

Imports of Cotton Textile Machinery in terms of overall value since 1951-52 have been as under :

Year	Imports in Rs. Crores
1951—52	7·3
1952—53	9·3
1953—54	7·4
1954—55	7·2
1956—56 (April-Dec.)	5·6

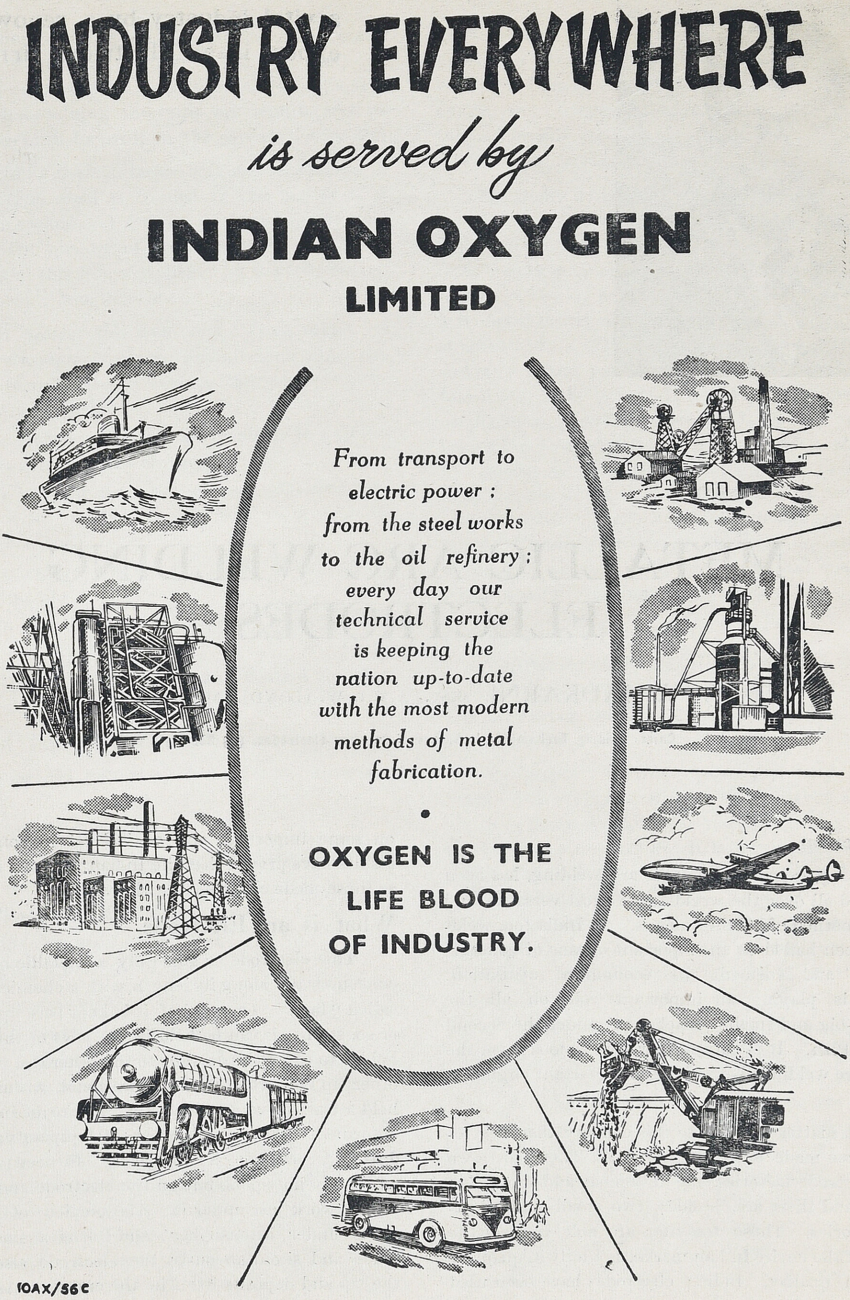
Itemwise, imports of textile machinery were not, until, recently, published in the Foreign Trade and Navigation Accounts of India. The Tariff Board, however, in their enquiry of 1954 estimated that the average number of ringframes and looms imported annually during the period 1951 to 1953 was 704 and 6160 respectively. According to the

published accounts of Foreign Trade for the year 1955-56, the imports of ringframes and looms during that year have come down to 183 and 1967 only respectively. This shows that at least with respect to spinning frames and looms, India is well on the road to becoming self-sufficient. There is still much advancement to be made in other items. But it is estimated that the output of textile machinery in India by the end of the Second Five-Year Plan would reach Rs. 17 crores and that would fully meet the domestic demand.

The development of the textile machinery industry in India has been hampered by several factors. One of these factors is the scarcity and the rising trend in the prices of the principle raw materials namely pig iron and steel. During the past five years, the prices of steel have gone up by something like 75 per cent and those of pig iron by about 50 per cent. This increase in the price of raw materials is much more than the increase in the price of the finished product. Apart from the high price, these raw materials are also not available in adequate quantities. The Tariff Commission in their report of 1954 recommended that high priority should be given to the industry in the allocation of these raw materials. The Government accepted the recommendation and it is to be hoped that in future the progress of the industry will not be held up on that account.

Another factor responsible for holding up the progress of the textile machinery industry is the difficult situation which the textile industry itself is facing. Countries like Egypt, Pakistan and Thailand which were large-scale net importers of textiles, have now succeeded in establishing textile industries of their own and this has led to a general decline of world trade in textiles. Then there is the re-emergence of Japan as the world's leading textile exporter. Consequently, India's exports have diminshed. Apart from this, there is the restriction imposed by the Government on the expansion of the textile mills in order to encourage the handloom industry. It is doubtful if the handloom industry will fill the gap between mill production and total requirements which will invitably grow with the rising standard of living under the Five-Year Plan. In the circumstances, it would be well if the Government policy is fixed after taking into consideration all such factors carefully. The textile machinery industry could not possibly develop if the mill textile industry is unduly restricted in its expansion.

The Indian textile machinery industry, as has been shown above, is of very recent origin, being only about a decade old. Even during this brief period, ths performance of the industry has been quite creditable, considering the handicaps it had to face. However, the industry now appears to have turned the corner. Indigenous quality has reached the standard and the prejudice which existed against it is disappearing. At the same time, the prospects of the industry emerging as an export-industry and becoming an earner of foreign exchange are being increasingly appreciated. It is to be hoped, that encouraged by Government support, the industry will make more rapid progress in future and will soon take its proper place among the industries of the country. ★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Here is a masterly analysis of a vital industry by a renowned expert in an illustrious firm.

METALLIC ARC WELDING ELECTRODES

S. V. NADKARNI, M.Sc., A.M.I. W. (LOND)., M.I.I. MET.

Chief Welding Technician, J. B, Advani-Oerlikon Electrodes, (P) Bombay

Introduction

Welding, especially metallic arc welding, has been recognised all over the world as the most versatile and efficient method of joining metals. In India too, welding has been hailed as an important means of conserving steel and ensuring its economical utilisation. Welding is playing an important role on all the projects—big and small—which come under the Second FiveYear Plan. It is natural therefore to look upon the metallic arc welding electrode as an important engineering tool.

It is a matter of pride to this country that electrodes are now made entirely in India. There are two major electrode factories, one in Bombay and another in Calcutta, and there are, besides, two small scale electrode factories. These together are able to meet the demand of the entire Indian market not only in quantity but also in quality. Indian electrodes have been used on some important and critical fabrications and the results have proved that the Indian products are as good as those made elsewhere in the world.

What is an Electrode

The electrode is generally a metallic rod covered concentrically along its length with a chemical material called "flux." One end of it is kept bare upto an inch or so, so that it can be held in the jaws of the electrode holder to carry the current to the other tip. When this other tip is touched to the base metal, withdrawn, and held a fraction of an inch away, an arc of intense heat is formed. This arc which has a temperature of about 6,900° C, becomes a miniature furnace with two extremely hot spots, one on the electrode and the other on the work just under it. The portion of the work melts under intense heat and forms a small pool or crater and simultaneously the electrode also melts at the tip and deposits itself in the crater. As the arc

travels further down the joint, the metal in the crater just behind the arc is solidifying into a dense joint. Obviously, feeding the electrode down all the time as it melts and maintaining the same arc length and its speed of travel call for skill on the part of the welder.

Arc welding used on steels is thus steel-making in miniature. The steel is formed in the matter of a fraction of a second and forms a vital part in the steel structure. The quality of steel deposited has to be controlled, and this is accomplished by the flux coating whose important functions are :

(1) To protect the weld metal from attack by atmospheric oxygen and nitrogen which can form oxide and nitrides, thus rendering the metal brittle :

(2) To maintain a steady arc resulting in uniform melting of the electrodes ;

(3) To help the formation of a smooth, even bead with regular ripples and to control its contour ;

(4) To control the cooling rate of solidifying metal ;

(5) To introduce suitable alloying elements into the weld metal ; and

(6) To flux, degas, refine and control the final composition of the weld metal.

Types of Electrodes

Electrodes can be mainly divided into 7 clauses as follows :

(1) Mild Steel electrodes ;

(2) Low hydrogen electrodes for high tensile low alloy steels ;

(3) Hardfacing electrodes ;

(4) Stainless steel electrodes ;

(5) Aluminium electrodes ;

(6) Non-ferrous electrodes ; and

(7) Electrodes for Cast Iron.

In the mild steel range, the electrode producer has to produce several types of electrodes with different performance characteristics and applications. Each type is distinguished by its flux coating and performance characteristics. The several recognised classes of coating are described in Indian Standard 815:1956. For example, there is an electrode for general purpose work, there is one specially designed for vertical and overhead welding, one designed specially for welding thin sheets, another one designed for deep penetration welds on thick sections and there is one which is made for high deposition rate, containing iron powder in the flux coating. Finally, there is one which is very low in oxygen and nitrogen content in the weld metal and this is specially used for welding joints which are subject to dynamic loading in service.

Electrodes designed for the welding of high tensile low alloy steels have generally what is known as 'low hydrogen coating.' This means that the coating is free from organic materials and combined water or crystallisation. The water from the potassium silicate binder is removed nearly completely by baking the electrode at about 350°C. The coating invariably contains metals and alloy in the powder form so that these are transferred across the arc to the weld metal, giving it a particular composition desired. It is thus possible to have a low hydrogen type electrode giving about 1.2% manganese in the weld metal, another giving 0.5% molybdenum in the weld metal and still another one giving nickel, chrome and molybdenum in the weld metal. These electrodes are in great demand for the welding of armour plate, cast steels and special alloy steels used for high temperature work.

Hardfacing Electrodes

Hardfacing electrodes include those which give a martensitic deposit so that they can be used for giving a wear-resistant surface on parts subject to wear and tear in service.

Martensitic electrodes are generally of three types : one giving a Brinell Hardness of about 300, which is easily machinable, another giving a Brinell Hardness of about 350 which is machinable only with special tools and a third one giving a Brinell Hardness of about 650 whose deposit can only be ground. The first one is used for building up teeth and gears. The second one is used for building up worn out rails and crossings and the third for building up the cutting edges of shear blades and oil expeller worms.

Then there is an electrode which gives about 12% manganese in the weld metal. Such an electrode is used for reclaiming austenitic manganese steel parts, such as rock crusher jaws, dredger bucket teeth etc. An improvement on this electrode consists of incorporating about 4% nickel so as to prevent the harding of the parent metal due to welding heat. The most recent development is an electrode giving weld metal with 16 to 17% manganese. This electrode enables one to get an austenitic manganese weld deposit on mild steel or carbon steel. This electrode is finding a great demand

on earth moving equipment at Dam Sites and other places.

Besides there is an electrode which gives a semi austenitic deposit containing 17% chromium and 4% nickel. This deposit is not very hard, but extremely resistant to abrasion and corrosion. This electrode is also finding wide application on earth moving equipment. Finally, there is an electrode which deposits high-speed tool steel composition with 17 to 19% tungsten, 1-2% molybdenum, 4 to 5% chromium, 4 to 5% cobalt etc. This electrode enables one to produce cutting tools from mild steel shanks.

Stainless Steel Electrodes

Stainless Steel electrodes have to be very carefully designed to ensure maximum corrosion resistance of the weld deposit in service. For these, the core wire has to be very low in carbon (carbon less than 0.04%), while the alloying elements *i.e.*, chromium and nickel have to be sufficiently high. The coating can be of the rutile type so as to give easy performance characteristics in all welding positions. For extreme corrosion resistance, the coating can be of the low hydrogen type. The electrode coatings usually incorporate columbium powder so as to get a columbium stabilised weld deposit. Such a deposit is immune to what is called "weld decay". Besides these, there is an electrode giving 25% chromium and 20% nickel in the weld deposit and another giving 25% chromium and 12% nickel in the weld deposit. Both these types are used for the welding of heat resisting steels, such as furnace parts. 25-20 electrode is also used for joining manganese steel to mild steel for joining spring steels and such other steels of special composition.

Aluminium Electrodes

Aluminium electrodes can be designed to give a deposit of pure aluminium or one alloyed with 4% silicon or 12% silicon. The flux coating of aluminium electrodes is specially designed to dissolve the alluminium oxide which is invariably present on aluminium base metal. Such a flux coating is very hygroscopic and, therefore, this electrode can only be manufactured in a dry and air-conditioned room. So far, attempts to manufacture this electrode in India have not been successful. Most of the aluminium work is, therefore, carried out with argon arc or by using special brazing methods.

Non-Ferrous Electrodes

Non-ferrous electrodes include those specially designed for the welling of monel, copper, bronze, nickel etc. Electrodes for the welding of monel, bronze and copper are already manufactured in India and all of these require the use of direct current.

Electrodes for Cast Iron

There are three different types of electrodes meant for cast iron. The first one is a low hydrogen type, giving a manganese alloy weld deposit. The work piece has to be heated entirely to about 500°C to ensure good welding with this electrode. There is another electrode with a monel core wire which enables welding to be carried out without pre-heating. The weld deposit obtained with this monel electrode is machinable, while the deposit obtained with the manganese alloy steel electrode is non-machinable. Lastly, there is a specially designed electrode with nickel core wire which has proved excellent for obtaining strong and even joints in cast iron. This electrode is finding wide application in all engineering firms, sugar factories, cement factories, chemical factories etc., for the reclamation of castings.

Problems of the Electrode Industries

The Government has to be congratulated on having encouraged establishment of arc welding electrode factories in India and giving them full scope for development by curtailing imports to the minimum. However, the electrode industry has to depend on foreign countries even for some of their common requirements. For example, mild steel core wire which is rimmed quality and very low in sulphur and phosphorus, is made in a limited quantity by Tatas. Even then the wire is not of uniformly good quality. Producers have, therefore, to depend on imported wire. It is hoped that production of electrode quality core wire will be included in one of the steel plants coming up in the country.

Another important requirement of the electrode industry is metals and ferro alloys in the powder form. High carbon ferro manganese and ferro silicon are, of course produced in India, but these are obtainable only in lumps. It is extremely difficult and uneconomical for an electrode manufacturer to attempt to powder these big lumps to the mesh size he requires. Besides, other vital materials such as ferro molybdenum, ferro chrome, chromium metal powder, nickel powder etc., are not at all obtainable in India nor is there any distant chance of obtaining them.

Another difficulty is the non-availability of monel and nickel core wires which are required for producing machinable cast iron electrodes, which are in great demand all over the country. It is unfortunate that the Government has not found the way to issuing enough licence quota to producers for obtaining these materials. The result is that hundreds of engineering firms are hindered in their maintenance work, especially as regards repairing of broken castings.

It is hoped that with the improvement in the foreign exchange position, electrode manufacturers will be able to obtain their full requirements of raw materials so that they will be able to play their part in the rapid industrialisation of this country.

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He is the silent builder of modern India...

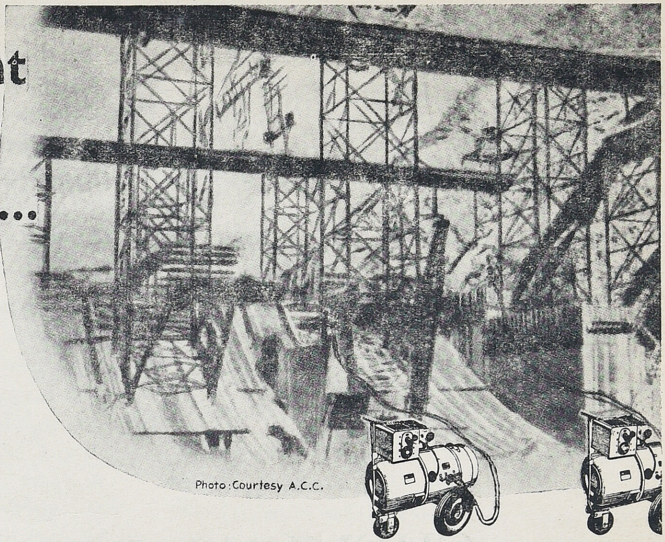
Photo: Courtesy A.C.C.

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Chemical Industry is creating history. In this brilliant article, the author sketches its remarkable achievements in U.S.S.R.

CHEMICAL INDUSTRY

K. VINOGRODOV

The Seven-Year Plan for the economic development of the U.S.S.R. (1959—1965), approved by the 21st Congress of the C.P.S.U. lays particular stress on the development of the chemical industry. In the seven years its output will almost treble, and the production of chemical fibre is to increase 4-fold. The output of the most valuable of them—synthetic fibres—will increase by 12-13 times. There will be a more than 7-fold increase in the manufacture of plastics and synthetic resins.

The seven-year period will see the construction of 140 major chemical enterprises and the reconstruction of another 130. A sum of 100,000-105,000 million rubles has been allotted for these purposes. About half of these means is to be invested into the construction enterprises manufacturing plastics, synthetic fibres, and synthetic rubber.

Plastics in Housing Construction

Due to their valuable physico-mechanical properties plastics have already found an extensive field of application in the U.S.S.R. being employed in many branches of industry.

In the coming seven years plastics and synthetic resins will find many uses in housing construction. Considerable quantities of slabs made from wood-fibrous materiels and wood-shavings are already being used in the U.S.S.R. They are manufactured by methods that involve the pressing of wood waste, *e.g.* shav-

ings, impregnated with synthetic resins or glues. In the course of 1959 to 1965 the output of wood fibrous materials will increase to 50 million tons per year. Glass-fibre plastics which are as light as dry wood and as strong as steel will find application in building construction, as well. They neither burn, nor rot, nor rust.

Porous plastics which are good sound absorbers and bad heat conductors also possess excellent properties for building construction. At present they are used in the manufacture of aeroplanes, railway coaches, refrigerators, but they are to be employed in the building of houses, as well. Laminated plastics—decorative materials for wall finishing—will also come into extensive use. These materials are produced by pressing special grades of resin-impregnated paper. Laminated plastics resemble well finished plates of valuable wood varieties or stone. Such walls may be washed without fear of spoiling their appearance. Plastics go into the manufacture of window frames, doors, steps and railings for staircases, water and sewer pipes.

Plastics will be extensively employed in the house-hold, too. Great quantities of unbreakable ware (pails, small tubs, bottles), all kinds of film materials and goods (table clothes, curtains, rain-coats, packing materials) are already being produced. Porolon—a light, durable porous material—has won general recognition. It goes into the manufacture of excellent matresses, pillows, seats and backs for upholstered furniture, carpets, warm lining for clothes, etc. It may be dyed into any colour, lends itself readily to washing, without losing its attractive appearance.

Fabrics from Chemical Fibres

At present the mauufacture of chemical fibres in the U.S.S.R. is second to that of cotton fibre, covering 25 per cent of the total production of textile raw material. The output of textiles in 1965 will be as high as 56 metres per head of population. Within the seven years the manufacture of woollen fabrics will increase by more than 50 per cent, that of silk fabrics 90 per cent, staple fabrics for suits 4.2-fold, and that of cotton fabrics with artificial and synthetic fibre will increase 6-fold. In the same period the manufacture of knitted goods will double, while that of knitted goods manufactured with artificial and synthetic fibre will increase more than 6-fold.

The advantage of chemical fibres over natural ones are quite evident. First of all they require considerably less labour. For instance, the manufacture of one ton of cotton fibres requires four times more labour than the production of a ton of rayon staple fibre.

A standard factory with an output capacity of 40,000 tons produces within a year the same amount of staple fibre as the quantity of cotton fibre obtained from 40-45 thousand hectares of irrigated lands, or as that of flax fibre from 200 thousand hectares.

The economic efficiency of chemical fibre manufacture affords the possibility for cutting down the cost of consumer goods. Another important feature is that chemical fibre production does not depend on any geographical, climate and soil conditions and is rid of seasonal dependence so characteristic of national fibre production.

At present the share of chemical fibres in the manufacture of silk fabrics in the Soviet Union covers 93 per cent, in wool fabrics it is 18 per cent, in knitted goods it is 19 per cent. By 1965 the share of chemical fibre in the total textile raw material for woollen fabrics will have increased to 30 per cent and in that for knitted goods to 40 per cent.

Synthetic Rubber

The first man in the world to obtain synthetic rubber was Academician S. B. Lebedev, a Soviet chemist. That was in 1930. Today scores of different kinds of such rubber possessing the more versatile properties are being manufactured in the Soviet Union.

It was ethyl alcohol obtained from food materials (potatoes, wheat, rye, etc.,) that went into production of synthetic rubber formerly ; whereas the new enterprises are and will be using only oil raw-material. The manufacture of a ton of ethyl alcohol from food materials requires 4.5 tons of grain or 14 tons ef potatoes, as well as the labour of 160 to 280 man-days, while the production of ethyl alcohol from oil gases requires only 10 man-days. A synthetic alcohol enterprise with an output capacity of 230 tons per 24 hours saves 1,000 poods of grain a day.

Soviet chemists have elaborated the production technology for a new synthetic—isoprene—rubber which almost fully reproduces the properties of natural rubber. Automobile tyres made of this rubber serve twice as long as do tyres made of usual synthetic rubber.

Chemistry in Agriculture

The great economic effect obtained in agriculture from using mineral fertilizers is well known. The Soviet Union possesses vast resources of apatite ores which are rich in phosphorus, phosphorite, sulphur, potassium salts, and other kinds of mineral raw-material. The Seven-Year Plan provides for the increase of mineral fertilizers from 12 million tons in 1958 to 35 million tons in 1965.

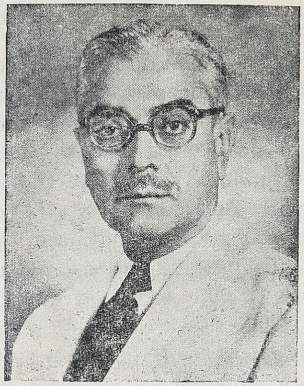
There is to be a considerable increase in the output of concentrated and compound mineral fertilizers containing the phosphorus, nitrogen and potassium necessary for plant nutrition.

The output of effective phosphorus-organic preparations for crop pest—and disease-control will grow in the seven-year plan period 18-fold, that of chemical weed-control means 9.6-fold, and of seed—pickling preparations by 20.8 times.

The application of a wide range of chemical weed and pest-killers will contribute to considerably reducing crop losses and enhancing crop yields. One ton of DDT., for example, has been found topre serve 75 tons of grain.

Chemical weeding of agricultural crops, which reduces labour expenditure 20-fold, is to find an increasing field of application.

It is difficult to describe in a brief article all the advantages that the accelerated development of the chemical industry gives to the Soviet people. But one can see from what has been said above that chemistry will considerably increase foodstuff resources, enrich the home with attractive articles, and permit people to acquire high-quality, cheap and attractive clothes. ☆



A great industrialist discusses here the problems of a great industry.

SHIPPING INDUSTRY

DHARAMSEY M. KHATAU

Chairman, The Scindia Steam Navigation Co. Ltd., Bombay

Since the last twelve months or more, there has been a gradual but serious depression in shipping all over the world. More and more tonnage has been laid-up abroad and is a matter of great concern to shipowners. Freight rates have had to be cut down drastically in many cases to uneconomic levels in order to meet the competition from tramp shipowners. Several foreign shipping lines are seeking pastures anew with a view to find a footing in Indian trades in order to cut their losses. This is likely to result in further keen competition in the existing trade routes of Indian shipping companies who have not yet found the opportunity to stabilise and strengthen their own resources to withstand depressions or severe competitions.

Our ships are sailing today with empty space in the overseas trades and even on the coast our vessels are feeling the pinch due to increased carryings by road transport and the railways. Under the present circumstances, it has become a vital necessity both for the Government and for the shipping companies to work in closer co-operation to mutual advantage. With this in mind, I feel that the following suggestions will have to be carefully considered by the Government to support and expand Indian shipping in various directions:

1. The Government should allot as much as possible of the cargo imported and exported on its own account and on account of various projects to Indian ships.
2. The rates of freight which Goverment should sanction for the carriage of such cargoes should be reasonable and economic and should not be compared with the prevailing tramp rates.
3. There should be cautious planned expansion based on the availabilities of cargo after a careful study of the prospective employment of such newly acquired ships in the routes in which they would operate.
4. Improvement in the port conditions and port equipments so that ships based on India get quicker turnround atleast in their home ports.

In regard to the first two points mentioned above, which I shall deal together, I may say that the State Trading Corporation of the Government could assist Indian shipping considerably by contracting for exports on a C. I. F. basis and imports on a F. O. B. basis and thus utilise Indian tonnage to the fullest extent possible. The present policy of the State Trading Corporation, however, appears to be to choose the cheapest carrier available and thus encourage foreign tramp ships at the expense of Indian Liner tonnage which is ready to offer regular service at steady rates of freight throughout the year. If Indian shipping is to expand and stabilise itself, Government should ask the State Trading Corporation to follow a broad-based and a long-term policy and assign its cargoes to Indian ships at economic rates so that out of such earnings there is sufficient scope to create resources for the purchase of newly constructed or near-new secondhand ships.

The Shipping Co-ordination Committee established by the Government to co-ordinate and co-relete Government's shipping space requirements also does not seem to have achieved much to support the cause of Indian shipping as such. The United States of America, the foremost maritime nation in the World today, has decreed that atleast 50% of its aided cargoes would be reserved for American ships. This is an example for the Government of India to emulate with a view to support Indian shipping. Unfortunately the powers that be, are in no mood to support Indian shipping, unless freight space is available at rates suitable to them and which may be even a little lower than the world market rates under one pretext or another.

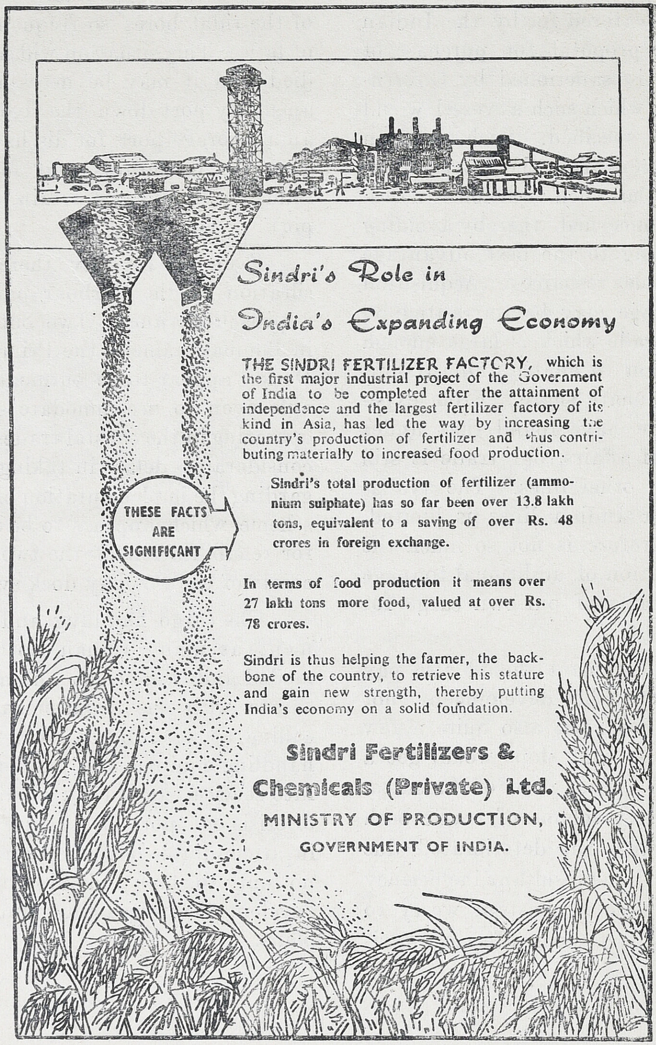
As regards the third point mentioned by me above, I would say that with a view to finance several long term schemes under our Five-Year Plans, Government is very keen on promoting the export drive of indigenous products either in the raw state or in the semi-manufactured or manufactured state and thereby earn foreign exchange. The Government is also very keen that the shipowners should take a prominent part in supporting such export promotion schemes by placing ships in the various routes so that our exports could find adequate shipping space as and when required. In this we need not assure the Government of our whole-hearted co-operation, but we certainly expect that the Government, whilst sanctioning entry of new-comers into the overseas trade, would see that there is a sufficient and suitable spread of ships in all the overseas trades of the country. This should be done without encouraging concentration of ships in one particular trade and thereby creating unnecessary and wasteful competition amongst the Indian shipowners. It will, therefore, be necessary for the Government to study the expansion programme of each shipping com-

pany so that there is no idle tonnage or no tonnage not fully utilised remaining with the shipping companies, which they would be tempted to place in trades which presently appear to be fully catered for by the Indian ships. Before the proposal for purchase of any new tonnage is sanctioned by Government, the route on which such a vessel would operate should be specified. Such sanction should only be given after the Government has satisfied itself that such addition is necessary in the route concerned, thereby avoiding wastage and utilising to the best advantage our limited available resources. Acquisition of additional tonnage may be warranted by India's maritime trade which is large enough to support expansion to enable Indian ships to carry their legitimate share. From experience, however, we have found that under the present state of affairs, our trade is still largely carried by other lines. The availability of cargo for Indian lines is limited. The real issue, therefore, is not so much the question of acquisition of additional tonnage but that of availability of our own cargo for our own ships.

Lastly, the Government should also pay serious attention to the development not only of the major ports but also quite a few of the minor ports so that ships would get a quicker turnround. The port of Calcutta, which handles a heavy volume of traffic both inwards and outwards has deteriorated due to falling drafts and the resultant inefficiency of that port is a source of constant worry to the shipowners. Apart from affecting navigation depths, the reduction in head water supplied has led to accumulation of silt and a gradual deterioration of the river conditions not to mention the increase in the intensity of the tidal bores so frequently experienced, of late. This situation will have to be remedied and it may be necessary to locate an ancilliary port down the river to be used as an anchorage port for discharge of bulk cargoes like foodgrains and fertilisers thereby reducing the heavy strain on the Calcutta port.

Even in Bombay there is considerable siltation in the harbour particularly in the approach channel. Two out of three docks, in Bombay namely, tne Prince's and Victoria Docks, appear to be outmoded and not suitable even to accommodate some of the ships operating in the coastal trades. There has been considerable delay in taking a decision regarding the implementation of the "minimum" scheme which appears to be essential in itself for rehabilitation of the two most important assets of the Bombay dock system.

The cargo handling and stacking equipment at many Indian ports are both outmoded and insufficient and are not commensurate with the requirements of the ships calling at such ports. Unless such modern handling equipment is purchased and pressed into service early, I am afraid, in a moment of crisis our ports are again likely to be the insurmountable bottlenecks, resulting in delay not only to ships and shipping but also to the development programmes under our economic plans. ★


Sindri's Role in
India's Expanding Economy
THE SINDRI FERTILIZER FACTORY, which is the first major industrial project of the Government of India to be completed after the attainment of independence and the largest fertilizer factory of its kind in Asia, has led the way by increasing the country's production of fertilizer and thus contributing materially to increased food production.
THESE FACTS ARE SIGNIFICANT
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In terms of food production it means over 27 lakh tons more food, valued at over Rs. 78 crores.
Sindri is thus helping the farmer, the backbone of the country, to retrieve his stature and gain new strength, thereby putting India's economy on a solid foundation.
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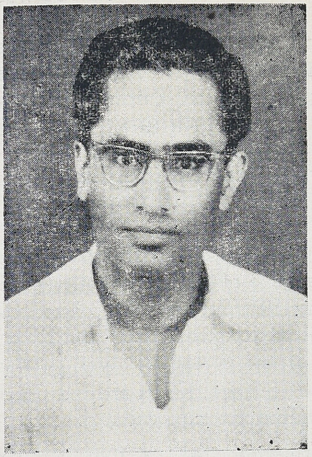

The story of Tea reads like romance. This illuminating article will be an eye-opener to many.

TEA INDUSTRY

S. VENKATACHARI

Advocate, Vriddhachalam

Thanks to the Amoy dialect of China, it gave the world a name for that beverage that cheers one but yet does not inebriate. The name was t'e pronounced tay which in Cantonese is called cha or chah and otherwise known as tay alias tee. The name travelled to Europe via Java where the Dutch took it. In English the transformation took the shape of tee from tay and finally settled at TEA.

The Chinese legend of the age of the Mythological Emperor Shen Nung places the introduction of tea-drinking to about 2737 B.C. However, the year 350 Ad. gains credence and has been mentioned in this regard and Kuo P'o in the Erh Ya or ancient Chinese dictionary contributes evidence to this. Originally South East Asia including the bordering provinces of South West China, North East-India, Burma, Thailand (Siam) and Indo-China were the places bestowed with tea gardens.

The Buddist priests were the earliest patrons of tea for combating intemperance. A kind of cake was made of steamed, crushed and moulded tea leaves. The coke was fired or roasted and shredded and later steeped in salted boiling water.

In Japan too the Buddist monks were the earliest tea users. Tea finds place in Japanese literature right from 593 A.D. and it is legitimately claimed that tea-cultivation had its beginning in 805 A.D. Saint Bodi Dharma who was also known as Daruma once fell asleep while he was in deep meditation. On waking up he in his frustation cut off his eye lids and threw them

on the ground. These eye lids took root, grew up into a bush and their leaves when dried and infused in hot water turned into a beverage that was supposed to banish sleep altogether. Tea was believed to have come into existence like this.

Tea shifted its venue from Japan to Java in 1684 and this time not a Buddist monk but a German naturalist and Doctor of medicine was to be reckoned with. This was Dr. Andreas Cleyer. It was Mr. Till Jacob who took tea from China to Japan in 1827 and this marks the beginning of Java's commercial tea industry.

Formosa got tea in the 19th century. Major Robert Bruce discovered indigenous tea in British India (Upper Assam). Actual tea industry on commercial lines was started by Governor-General Lord Bentink in 1834. Coffee gave place to tea in a dramatic way in Ceylon in the end of the 70s. Russia's tea history begins by about 1847, that of Natal in 1850 and Nyasaland in 1878. Uganda and Kenya began to produce tea in 1900. Arabs found tea in 850 A.D., the Venetians in 1559. The English took to tea in 1598 and the Portugese in 1600. The Dutch brought tea to Europe first about 1610 and Paris in 1648.

John Company which is a synonym to the East India Company had the tea monopoly from 1600 to 1758 in which year it was dissolved.

One of the most picturesque eras in the maritime history was the day of the clipper ships which transported tea from China to England and America.

America started as a nation of tea drinkers. It was the Boston Tea Party that cast the die for coffee in America. By 1939 the tea and coffee habits of the two countries were reversed. The John Company figured in many adventures including the introduction of China and Indian tea into England and the U.S. and the Tea Act of 1773 which caused the Boston Tea Party and precipitated the American Revolution. The Tea Act attempted to perpetuate John Company's monopoly of the tea trade—a thing distasteful alike to British and American merchants. There followed not one but six of American Tea Parties. So England lost an Empire to oblige the East India Company and a Great Republic was born with the perpectual disinclination for tea.

Scientific

Caffeine in tea supplies the stimulating quality which because of its purity is supposed to be without any harmful reaction. There is tannin that supplies the strength of the body. The flavour or aroma in tea is given by the essential oil in tea. These things are the chief factors that determine the cup value of tea.

For fully fermented tea, a five minute infusion is essential. Indian Tea is fine if done like this. If tea if used with milk a six minute infusion will give fineness. The coming out of the aroma or flavour is the suitable time for preperation. Tea leaves are not fit for use a second time.

The following teas are classified for five minute infusion:

Kind	*Caffeine%*	*Tanin%*	*Soluble Solids%*
Java Black Tea	2·2 to 4·4	6·20	16·26
Japan Green Tea	2 to 3·3	4·12	16·26
China Black Tea	2 to 3·7	5·10	6·22
Indian Black Tea	3 to 3	6·10	22·25

Tea is classified as green or unfermented and black or fermented tea. People in the west use mostly the black tea. OOLONG is a semi-fermented tea and prepared in South China and Formosa. The Chinese as well as the Shan tribes pickle the leaf and make LAPET tea for consumption.

Production, Consumption and Export Position

Though coffee predates tea in origin, tea is more popular and also cheaper. China was the only country that supplied tea to the entire world as lately as 1830. In the beginning of the 18th century China tea seeds and plants were

brought to India. With them about 50 companies made their way in tea production by 1860. Thereafter tea production was on the increase and Assam and Darjeeling were noted centres in tea production. Even export trade was done after meeting local requirements. South India—the cradle of an ancient civilisation and culture— that was penetrating—stands on a very sound footing in the production of tea. We in South India heard of tea even in 1853 but it took us time to begin producing tea in large scale. At present tea producing areas are Assam, West Bengal, Dehradun, Kangara Valley and in the South Anamallais, Central and South Travancore, Malabar, Mysore, Nilgiris and the Wynad.

Supply and demand is the governing factor of tea prices. Britain has been the largest consumer of the Indian tea right from the prewar period. After 1946 India began to export tea to other countries directly and not through the London auctions since the Block purchase Scheme was abolished in 1946. Regular auctions were held at Calcutta and Cochin and exports emenated from these two centres. Prices of tea rose in 1940-41 and exports to other countries were paralysed and the industry was affected much. The condition was eased however in 1946, but even then the prices continued to be higher in Britain than the other free markets. The Second World War took a heavy toll from the industry as all economic activities suffered due to the aggressive fighting. There were many contributory reasons but all of them were of a general nature.

Thanks to the hard and pioneering endeavour of the tea interests for the past 120 years, more tea is in a preeminent position and India is the leading tea producing country in the world. There are more than 6800 registered tea gardens in India. Total acreage of the tea gardens are 8,00,000. These acres are appeared across Assam, West Bengal, Bihar, Uttar Pradesh, East Punjab, Madras and Kerala. Above 12 lakhs of workers are provided with employment by the industry. Tea industry furthers the progress of some allied industries like coal, cement, steel, fertilisers, machinery, transport, plywood etc., etc.

Export

Year	*Export value in Lakhs Rs.*
1950-51	9,344
1952-53	8,020
1953-54	13,162
1954-55	14,722
1955-56	10,869

Production

Year	*in 1000 lbs.*
1951	6,29,197
1952	6,27,466
1953	6,14,100
1954	6,44,371
1955	6,64,854
1956	6,62,381

The International Tea Regulation Scheme

The representatives of the tea producing countries entered into an International Agreement which each and all of their respective Governments approved and passed the necessary legislation for operating the scheme effectively. The scheme has been in force from 1933.

In America

Indian tea has not had its firm grip on U.S. Instead Formosa is expected to earn 7,500 thousand U.S. Dollars by exporting 30 m lbs. of tea this year says the Taiwan Tea Export Association. Of this quota half would be Black Tea for the U.S,, U.K. and Latin America.

The U.S. Tea Council reports a disquieting news of the falling in tea consumption in U.S. since 1955. It is no wonder the council considers the consolidating its past gains. The American children are given mainly cocoa. With plenty of milk at their disposal they could

not do otherwise and so cocoa is a more popular drink there. American settlers in Lyberia turn out cocoa in large scale and the U.S. are obliged to give them a market. These go to show that the battle of tea in America is not yet decisive though we may not fail to note that is a good lot of propaganda there for tea. It is hoped that tea sales would be doubled in America in 25 years, once the consolidation of past gains is over and the promotional drive is kept up.

The Indian Tea Delegation was greatly concerned with this not-too-encouraging tendency in tea consumption when they visited the U.S. and other countries last year. India is likely to raise her contribution towards propaganda in U.S. for tea.

In Canada

No amount of propaganda by the Tea Council and the increase in population make tea hold its own in Canada. The Canada Tea Council states that the biggest problem before tea men in that country is to make the younger generation more tea minded. The expected $2\frac{1}{2}\%$ increase in consumption every year when compared to population is conspicuous by its absence. However no room is given for despondency and it is hoped that continuous propaganda would show satisfactory results in expanding the Canadian market for tea.

In the U.K.

British citizens drink most of our tea. The U.K. is a major importer of Indian tea. Britain is faced with a rise in price of other beverages like cocoa and this leaves citizens to drink tea instead of cocoa. Yet another reason for the large Britsh Tea consumption is the Britishers' war-time tea tendency. Recently there was a rise in retail price of tea and in 1954 there was a general rise in retail prices about four times.

Derationing of tea in U.K. was a step towards more imports. China Tea is also imported in large scale for mixing with more expensive Indian Tea and Ceylon Tea. Just now the market in London is crumbling under the weight of heavy offers from India-Calcutta market. Before committing herself again Britain would cut down her purchases in India until the inflated stocks are full spent.

North Korea

India and North Korea have now concluded a trade agreement. The State Trading Corporation will export tea among other goods to North Korea.

At Home—In India

Prohibition was a major reason for a shift to the consumption of tea and eversince it is moving up. Otherwise tea could not have taken the place of the delight of the worker, the envy of the soldier and the unpennied and the habit of the cinema-goer.

The second major reason for the shift to tea is the multiplying effect of the growth of the cinema industry. The price of coffee has a rising, jerking influence on the consumption of tea. As long as coffee enjoys such monopoly as it does today, the price of coffee may continue to be higher and beyond the reach of many and this will keep the demand for tea more.

The fourth reason for the increase in the consumption of tea lies in the increase of restaurants and small stalls. The tea is within the reach of the poor. Great consumption and greater production holds the position of tea on sound lines.

Tea Politics

There is keen lobby interest in the idea that the Communist Ministry in Kerala would nationalise the tea industry in Kerala where plantations are a big factor in the State's economy. It is because British capital is predominant in tea industry, only 35·8% being Indian, this nationalisation move is given a momentum.

A non-official motion for the nationalisation of the tea industry in India was rejected in the Lokh Sabha recently. It was said that our interest would be served better by continuing

the tea estates as they are. It is feared that our export position would be greatly undermined if the foreign tea interest in India were treated in the manner suggested by the sponsors of the nationalisation. The official statement reads that a large percentage of net profits is ploughed back into the industry for its improvement. It is estimated that Rs. 181 crores would be required to nationalise the tea estates not to speak of the amount that would be required as running capital for the industry. The Government feel that they could illafford spend this amount as it could very well be utilised for other useful purposes.

Propaganda

All schemes relating to propaganda in India and abroad are reviewed by a special committee of the Tea Board and the Directortate of Propaganda implements such schemes. As part of propaganda for our tea, Tea Councils are set up at the importing countries.

Tea Centres are opened in important towns where there is an up-to-date lounge in which one can relax and sip a cup of tea, where a a beautiful auditorium and fully equipped demonstration wing is attached to tell the city populace all about tea and tea industry. Such a kind of scheme is to cost the Tea Board Rs. 1.5 lakhs and the first Tea Centre was opened in Bombay in 1956 and it is followed in Madras. Industrial areas will have workers' Tea Rooms.

It is typical of TEA and the TIBETAN who takes tea to the tune of thirty to sixty cups every day—a coarse tea pressed into the shape of bricks which are accepted as currency and carried about in coverings of hide, sometimes for a distance of 3,000 miles across the great snow clad mountains and valleys of our difficult Himalayan country.

It is a hard fact that the kind Gods have given men the means and the zest for enjoying this admirable TEA.

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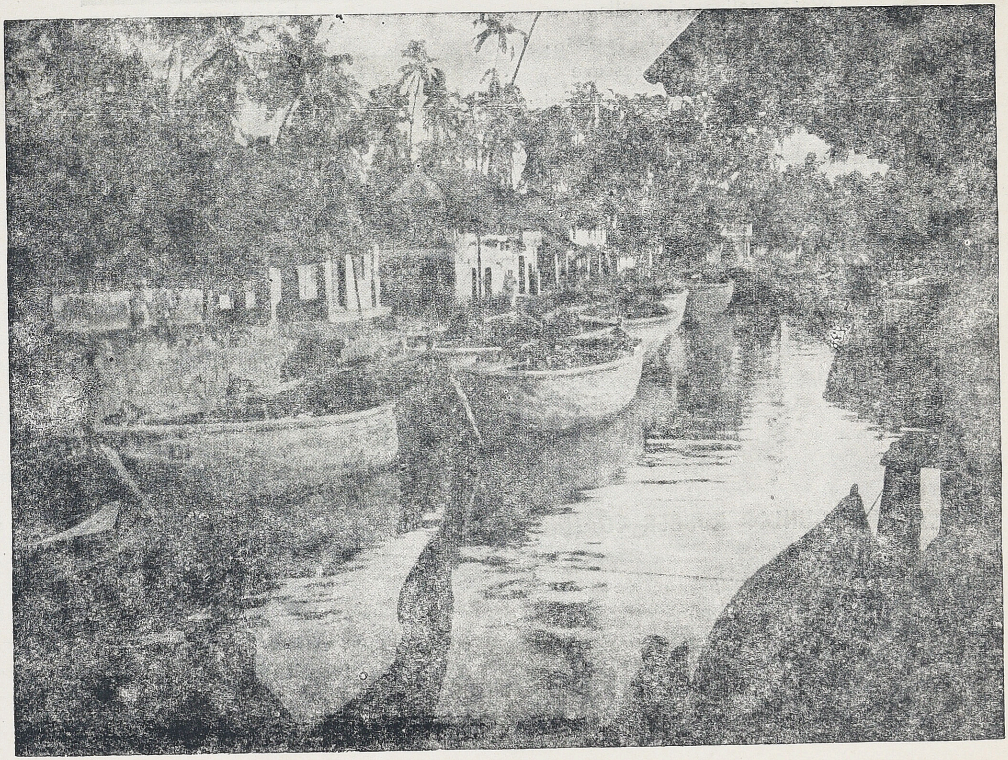

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product
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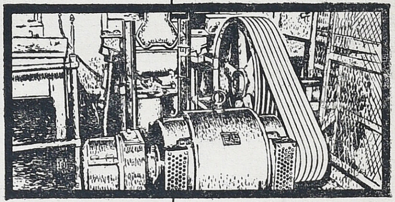
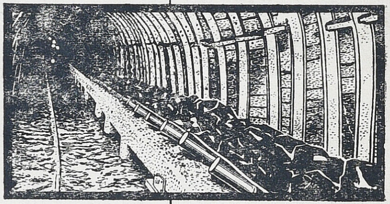
Efficient transmission and distribution of motive power... Water delivery in mills, mines and industrial plants... Irrigation... High pressure spraying... Wherever there is a job to be done, in the home, in the fields, or in industry, there is a wide range of Dunlop products for use under a variety of operating conditions.



INDUSTRIAL V-BELTS

TRANSMISSION BELTING



CONVEYOR BELTS

LONG LENGTH BRAIDED HOSE

TRADE MARK

THE DUNLOP RUBBER CO. (INDIA) LTD.

DRAC-28A

Eminent future awaits South Indian Industries and Neyveli will open up new horizons.

INDUSTRY MOVES SOUTH

South India's golden age is remembered today by its fabulous temples. The story of her pre-eminence is written in the carvings and sculptures that abound in far-flung countries of South East Asia. The early South Indians had a sea-faring tradition and were among the first colonisers known to history. They took their art and their wares to many lands and were no strangers to the western world.

It may surprise many to know that Christianity was introduced to South India years before it was known to Europe. The Cathedral of St. Thomas, with its beautiful stained glass windows, is ascribed to the 1st century and St. Mary's Church in Madras is believed to be the first Protestant Church built in Asia.

Apart from cultural contacts, South India developed a lucrative export trade in various products ranging from spices to silk textiles and from ivory curios to diamonds. But the most eventful contact with the outside world began in the year 1639 when the merchants of the East India Company established a settlement at Armagaum near Nellore. A year later, Sir Francis Day thought it fit to shift the settlement o Madraspatnam, then a squalid village stretching five miles along the shore of the Bay of Bengal. Soon this first camp of thatched huts was replaced by the imposing Fort St. George. A fine natural harbour and a rich hinterland helped Madras to grow beyond the wildest dreams of its founders. The tiny village of five square miles became a city of 50 square miles and the metropolis is today the fourth largest city in India and her third largest port.

Madras, along with Bombay and Bengal, was the first to respond to the impact of scientific and liberal thought which dominated Europe in the 19th century. The University of Madras, one of the oldest to be established in India, has just celebrated its century. It has given the country men of letters and science who have brought India international fame.

Though the present Madras State is a part, and a small part of its old self which comprised also a good portion of the States of Andhra,

Kerala and Karnataka, it has emerged as a homogeneous and integrated territory of 50,110 square miles with a population of 30 million. The population of Madras City is 14,16,000. The total mileage of roads in the State is 28,553 and according to 1955-56 figures, the total number of motor vehicles is 37,456.

With the rest of India she is on the march towards the goal of economic prosperity through speedy industrialisation. The First Five Year Plan saw the inauguration of giant irrigation projects like the Lower Bhawani and Malampuzha projects. During the First Plan, Madras recorded an additional production of 13.34 lakh tons of food cereals and the average rise of production per acre was the highest in India. In generation of electricity also, Madras showed impressive results, installed capacity rising by 110,200 k.w. to 256,000 k.w. in the State grid. The State has mineral deposits for the production of iron and steel, aluminium and copper.

Of modern large scale industries, textiles are the largest with 105 mills. Sugar, Cement, Chemicals, Glass and Match manufacture are the other notable industries. Madras has been the main centre of leather production in India for centuries and it is not surprising that out of 80 big tanneries in India, 50 are located in this State. In all there are about 300 tanneries, large and small, in Madras and the Central Leather Research Institute has been established there to help this growing industry which earns considerable foreign exchange.

Among cottage industries, the biggest is the handloom industry with 5.6 lakh looms. Exquisite silk and cotton textiles are produced by the handloom weavers of Madras who have inherited a tradition which runs back to the earliest days of civilization. The same skill is displayed in handicrafts like wood and ivory carvings, brass ware, cane working, etc. Handloom products of Madras are now enjoying unusual popularity in Europe and the U.S.A., and given proper encouragement, they have a great future in external markets.

The lack of coal and other sources of power long stood in the way of establishing heavy industries in the State. With the inauguration of the Neyveli Lignite project, which will yield 3.5 million tons of lignite per annum, and the execution of the Kundah Hydro-electric Scheme, which promises to treble power supply in the State, a new era of industrialisation has begun.

Under the impact of the Five Year Plans, the industrial pattern of Madras is being rapidly diversified. Before independence, the engineering industry in Madras was poorly developed but within the last five years, two full-fledged automobile factories, a bycicle factory and a factory for the manufacture of heavy machinery, have all sprung up in the city and its environs. The integral coach facto y at Perambur, under the Public Sector, is in full swing.

The numerous industrial enterprises growing up in and around Madras are a pointer to the fact that industrial progress will no longer be confined to the north. The transport requirements of South India will increase in proportion. It was in the South, in fact, that commercial motor transport in India had its birth nearly 45 years ago. The relative inadequacy of rail communications in South India also emphasises the great importance of road transport in this region.

The shortage in India's production of tyres and tubes in relation to demand, and the anticipated increase in motor and cycle traffic as a result of the Five Year Plans prompted the decision to open a new Dunlop factory in South India.

Amidst surroundings, rich in the relics of a great past and populated by a gifted and industrious people, the Dunlop Rubber Factory at Ambattur—about 11 miles from Madras—has started production. It opens a new chapter in the industrial history of South India. It is one of the newest of many new enterprises in South India.

HMT is bound to form a nucleus for rapidly progressing Indian Machine Tool Industry and contribute its own share to the Nation's gigantic plans of industrialisation.

HINDUSTAN MACHINE TOOLS PROGRESS IN TWO YEARS

A SPECIAL CORRESPONDENT

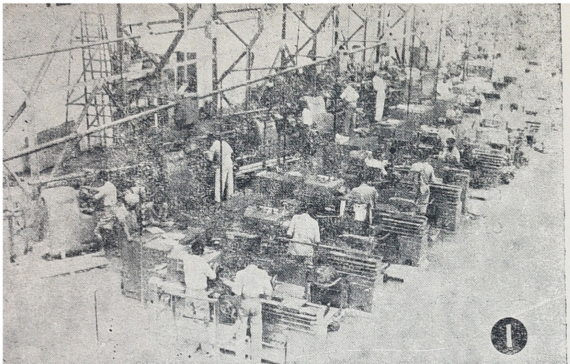
The Hindustan Machine Tools which only four years ago was the subject of criticism both in the Parliament and the Press has risen to commendable heights in as much as progress in production is concerned. In fact, the Government of India then requisitioned the services of a British Machine Tool expert to report on this project and in his report, this expert also came to the conclusion that the project which was "a veritable machine tools salesman's EL Dorado" was a "dismal failure". This expert further recommended the linking of this project with some of the private machine tool industry. Perhaps this recommendation verges more towards the controversey between the Public and Private Sectors.

The reason for the failure of the project can be found in the steps taken by the Management after 1956 to step up production. The fact that introduction of multiple shifts and measures like recruitment of emergency additional personnel, provisioning of increased training facilities and stores and raw materials enabled the factory to step up production, clearly indicates that the factory's full capacity was not till then utilised. With the Management taking the steps mentioned above, it was possible for the factory to reach an output of 135 machines against its original taɪget of 57 during the financial year 1956-57. These results further promoted the Management to augment its measures to step up production further, and in 1957-58, the factory turned out over 400 machines against its original planned target of 157. It is significant to note that these 400 machines produced by the HMT were not merely lathes as planned earlier but included a variegated range of milling machines also. HMT's production during this period (i.e., 1957-58) represented two-thirds of the entire output of machine tools of the country for that period.

The latter half of 1958 was marked with further strides towards progress and the production rate reached 54 mark in the month of November 1958. The same was further stepped to 63 in December 1958 and this was followed with a RECORD PRODUCTION OF HUNDRED MACHINES IN THE MONTH OF JANUARY 1959. At the end of the financial year 1958-59, the factory turned out 552 machines against its original planned target of 238.

Indigenous contents of Hindustan Machines

The percentage of indigenous contents of HINDUSTAN lathes now stands at 95. The percentage of indigenous contents in HINDUSTAN Milling Machines and HINDUSTAN Radial Drills which stand at little over 60 and 30 respectively, will be



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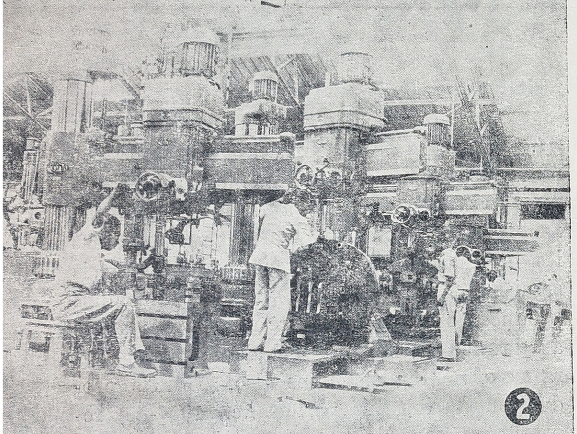

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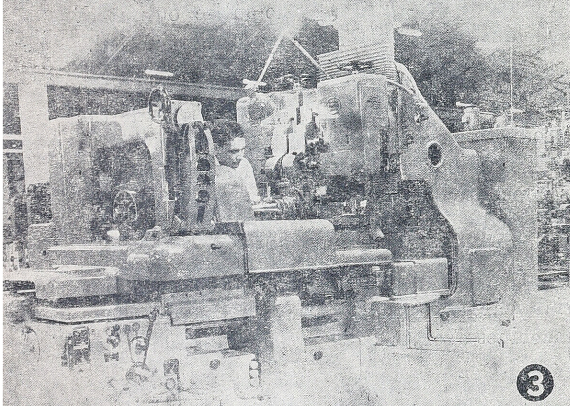

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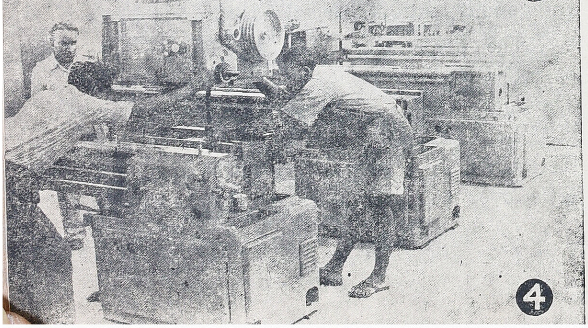

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stepped up to 95% by 1960—61. The earlier expectations of the British expert that the skill of the Indian workers would be confined to painting and assembly of machines have thus been belied.

National Asset

The factory thus came into the public eye and what was once thought as a 'colossal financial failure' was commented upon as "an asset of considerable national importance", by another visiting mission of Machine Tool experts in January 1957. It may be recalled that in January 1957, the British Heavy Engineering Mission headed by Sir Eric Coats which reviewed this project at the request of the Government of India reported that "if Hindustan Machine Tools continue to progress as they appear to be doing at the present time, they shall be considered to be an asset of considerable national importance". The Caotes Mission also reported that the lathes manufactured by Hindustan Machine Tools is "First Class and compares favourably to machines of this type manufactured in any part of the World". Numerous favourable comments continued to be received by the Company notably among them being from Mr. George Merryweather, head of the U.S. Machine Tool Experts and the Russian Heavy Engineering Mission led by the Soviet Deputy Minister for Heavy Industries, Mr. I. Babich.

Price Policy

Consequent on their three fold increase in the rate of production against the planned target, the factory has been able to reduce the cost of production substantially and the benefit of this was passed on to the consumer by reducing the sale price. The sale price of lathe has thus been brought down from Rs. 39,000/- in 1956 to Rs. 29,500/- in June 1958 as against the landed cost of Rs. 40,500/- for imported machines of equivalent quality. What is more is this project once dubbed as a

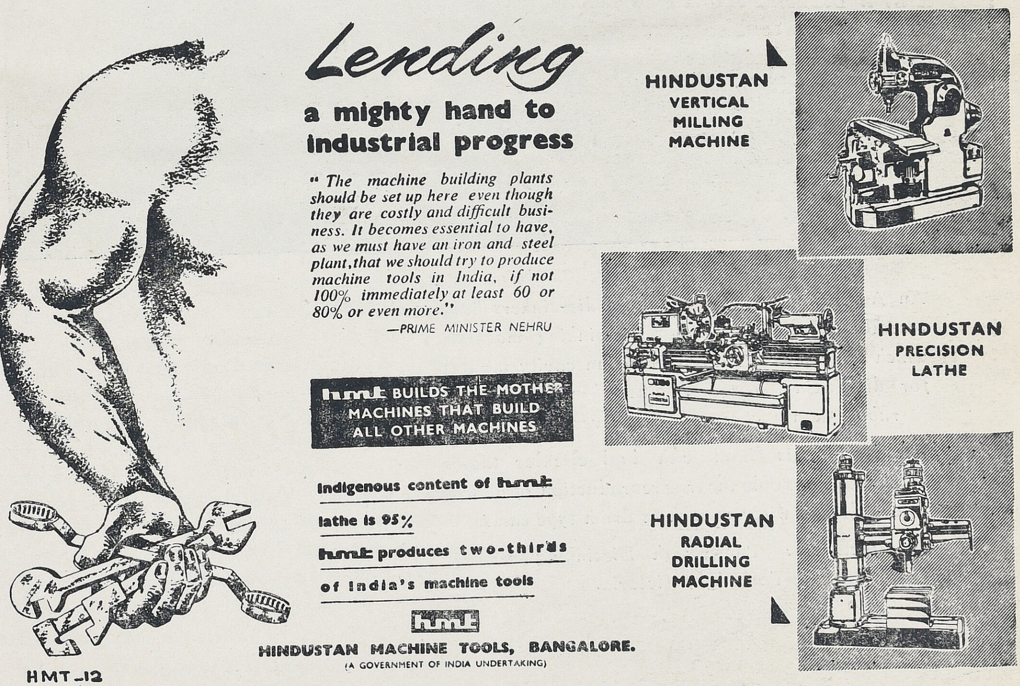
colossal financial failure reported a profit amounting to Rs. 30 lakhs during that period. It may be noted that this was only the second year of trading for Hindustan Machine Tools.

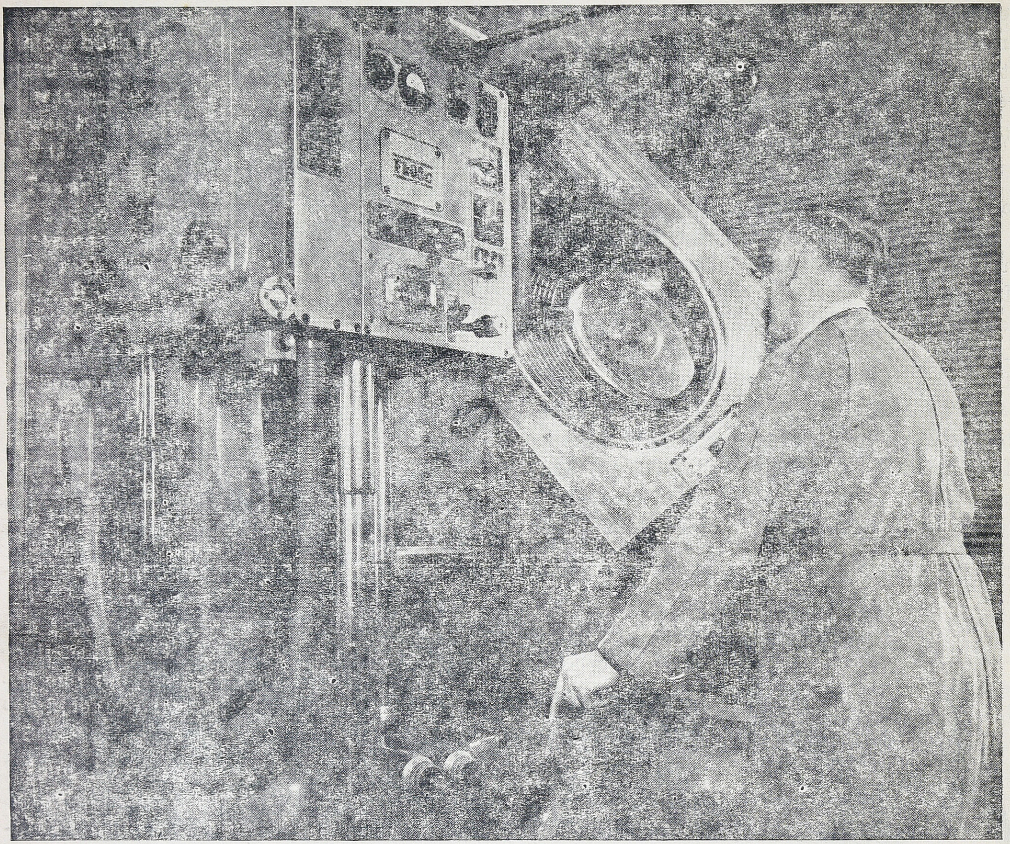
Workers' Participation

The year which thus brought financial soundness for the project is also marked with a significant step taken by the Management in introducing Workers' Participation in Management. This was, of course, in accordance to the recommendation of the Government of India who selected the Hindustan Machine Tools as the first unit in the Public Sector for introduction on experimental basis for setting up Workers' Participation in Management. The Joint Council of Management has 10 members, five being represented by the employees. The Council which is being entrusted with certain specific responsibilities is consulted by the Management on matters like general administration, standing orders, introduction of new methods of production and manufacture etc. The Council is kept fully informed about the general economic situation of the concern, organisation and general running of the undertaking, methods of manufacture and work and long term plans for expansion.

Further Diversification

Tke factory's production has been further diversified to include smaller Production and Universal Lathes. These are specially designed to cater to the requirements of small and medium scale industries in the country. It is expected that the first series of these lathes will be in the market very soon. ★





An Australian firm of precision die-sinkers have recently installed a type of die-sinking machine, which can reproduce large precision cavity moulds for die-casting, forging, plastic moulding and rubber manufacture. It cuts reverse images.

The machine is fitted with dual circular tables which make possible the true reproduction of helical or cylindrical forms such as drum type cams.

Manufacturers: Pantogragh Diesinking service, Tooronga, Victoria.

Anything colourless is virtually lifeless. Colour spells happiness, a good living and prosperity. Here is a fine account of a fine industry by a mighty fine writer.

INDIAN PAINT INDUSTRY

G. H. GATES-REED

Publicity & Sales Promotion Manager, Shalimar Paint, Colour & Varnish Co. Private Ltd., Calcutta

The stability, as well as the flexibility of the Indian Paint Industry is convincingly emphasised by the simple fact that imports of ready-mixed paints and industrial finishes into India have steadily decreased and have now virtually ceased during a period, and at a time, when India's rapidly developing industrial Revolution has necessitated a demand for paint finishes of all types, several hundred per cent greater than was so fifteen years ago. Again, this tremendous increase in demand covers many scores of specialised formulations for industrial finishes essential to the many new and varied industries now producing indigenously manufactured items which were previously imported.

Table 'A' conveys the scope of this change and the magnitude of future trends. However, it cannot detail the really impressive work done by the Indian paint Industry in research, formulating, testing, re-equipping and manufacturing to international quality standards these varied and complex new requirements. For example, Insulating Varnishes and Compounds for the Electrical Industry have required the leading paint manufacturers to add scores of new and often complex formulations to their ranges at considerable initial expense, and with little hope of an immediate adequate return until those developing industries have reached mass production level.

The above is of course, apart from the ever-increasing need for standard paints for the decoration and protection of factories and their equipment, the homes of the workers, and domestic uses generally. Paint and colour

Mr. R. S. T. Cooke, Administrative Manager of Shalimar Paint, Colour & Varnish Co. Prv. Ltd., with whom he has been since 1946

consciousness is rapidly taking hold throughout India, and with improvements in the standards of living, will continue to do so.

The Hon'ble Manubhai Shah (Minister of Industry) has said that " the Paint Industry has a record of notable achievements in the First Five Year Plan."

He then quoted the following figures :

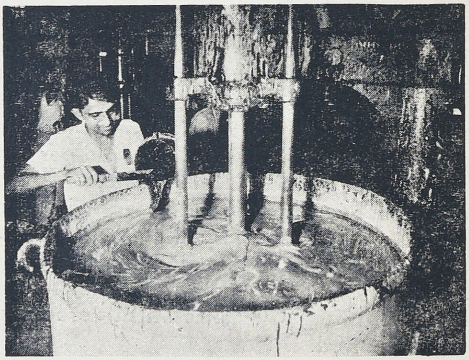
" The production of structural paints rose from 526 thousand gallons in 1950 to 865 thousand gallons in 1955 and 1,125 thousand gallons in 1957. The manufacture of air drying synthetics, nitro-cellulose lacquers, stoving finishes, insulation varnishes, etc., for use on transport and in industry, including electrical industries, registered an increase from 340 thousand gallons in 1950 to 1,350 thousand gallons in 1955 and 1,798 thousand gallons in 1957."

A breakdown of the figures is given as follows :

Item	Production 1955	Production 1957
Distemper (dry and oil bound)	1,841 tons	2,201 tons
Plastic emulsion paint	34,560 gallons	62,297 gallons
General purpose paints and varnishes for buildings	22,612 tons	24,615 tons
Structural paints	8,64,750 gallons	11.2 ,000 gallons
Finishes for industry, transport and electricals	1·35 million gallons	1.8 million gallons

Undoubtedly, the strength of the industry today lies in a past history of steady achievement dating back to the turn of the century. The first major unit was established in 1896 at Shalimar, near Calcutta, mainly to supply marine finishes for the ship-building yards of the Hooghly and P.W.D. and Railway requirements, basically simple finishes to manufacture by modern standards. Today, there is little doubt that this particular factory is one of the most up-to-date in the east.

Other major units came into operation at regular intervals from 1917 on, so that today the organised sector of the Industry can be grouped under three headings :



180 gallons of paint in a mixing pot

(1) Firms with annual turnover of Rs. 50lakhs plus 6 units

(2) Firms with an annual turnover of between Rs. 10 to Rs. 50 lakhs 12 units

(3) Small units with production ranges between Rs. 1 and Rs. 10lakhs 32 units

This total of 50 organised manufacturing units represents those registered on the Central Government list.

However, it is recognised that there are approximately 200 factories throughout India engaged in the production of paints, enamels and varnishes.

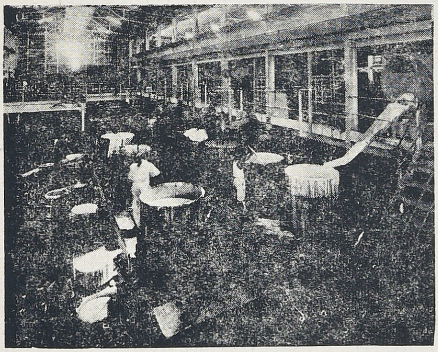
On the other hand, Government figures are based only on the returns of the 50 units quoted above, so that there is a certain looseness to the output statistics that follow:

Output for 1956 was	41,600 tons	
,, ,, 1957 ,,	42,300 ,,	

The figures for 1958, as recorded in the Journal of Industry & Trade for the period January to September show a total of 35,926, with the fourth quarter still to be quoted.

The value of the 1957 output is shown as Rs. 12.5 crores, an increase of Rs. 2.5 crores on the 1956 figures. (A crore is approximately £ 7,00,000).

There has been no appreciable change in capacity during the period 1957/58. In fact,



Enamels are ground in the huge Ball Mills

Dry Distemper being carefully weighed before final packing

the industry is not working to capacity basically because of a shortage of essential raw materials and the irregularity of overseas supplies when licences are available

This aspect of the Industry's need to develop its own source of supply of materials indigenously has been dealt with some length by Sri Manubhai Shah, Union Minister of Industry, who quoted the following figures covering the recently introduced production indigenously of raw material.

	1950	1955
Alkyd resins	67 tons	713 tons
Anatase titanium dioxide	—	1,809 tons
Aluminium Paste	13 tons	260 tons

as well as indicating that: "New raw material items for the manufacture of which schemes are under implementation or proposed are set out below:

Pigments	...	Rutile titanium dioxide, phtalocyanine blue, prussian blue from iron oxide sludge.
Synthetic Resins	...	Phendic resins pure and modified, maleic resins.
Plasticisers	...	Dibutylphthalate.
Solvents	...	Butyl and Amyl alcohols, butyl and amyl acetates. glycol ethers and esters, methyl ethyl ketone, methyl isobutyl ketone, diacetone alcohol.
Basic chemicals	...	Phthalic anhydride, pentaerythritol, urea, phenol, formaldehyde."

So far as exports are concerned, it has not been possible to develop them as much as the Industry and Government would have wished because this is mainly of raw material shortages and the cost of importing when licences are available—a cost which has to be passed on. However, the intention on the part of the Industry to develop exports has certainly always been there. There is another aspect. Mr. R. S. T. Cooke, Chairman of the Paint Federation, made this telling comment at the Annual General Meeting of the Federation; "It often seems to be overlooked that almost every manufactured article is finished with a protective or decorative coating which has been made in a paint factory and the amount of paint which is in fact exported in the form of applied coatings on the products of other manufacturing industries must be appreciable and steadily on the increase." Reference to Table 'A' again, will confirm this fact—bycicles, fans, pumps are among India's exports depending for their shelf appeal and their ability to compete successfully with the products of other export nations to a great extent upon the quality and appearance of their finish.

It is hoped that this brief resume of the activities of the Paint Industry will have shown that no industry has a greater service to perform over as wide a field of industrial activity and development as has the Indian Paint Industry. Although the industry requires certain basic raw materials as imports, these are relatively small by comparison with the drain of international currency that would have arisen if prepared paints had had to be imported to satisfy the ever-growing requirements of India's developing industries. This need has not arisen because there is possibly no better organised, flourishing or up-to-date light industry in India than the indigenous paint industry.

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Here is a most rational analysis of the problems that face this ever-growing industry.

ELECTRIC SUPPLY INDUSTRY

E. D. SHEPPARD

Killick Industries Ltd., Bombay

The Electric Supply Industry is one that has, along with a select few, need for heavy capital investment. This has made it necessary for development to be planned well ahead. Dams, generating plants and transmission lines are not built overnight. Long before they are scheduled to go into service, reasonably accurate forecasts must be mapped out to determine when they will be needed, where they should be located and most important of all that the necessary finance is secured.

The record of the Electrical Supply Industry in India has been one of capacity being sufficiently ahead of demand, although more recently pockets where power is short have tended to appear. This trend is a feature common to the rest of the world, and assuming that adequate priority continues to be given for power development (and sufficiency of foreign exchange is assured) there is no reason why the Industry should not outstrip its past record. This, of course, is subject to the reservation that the regulatory climate under which the Industry operates, adapts itself to the changing situation.

Need for Regulation

A public utility ordinarily has an assigned field of operation where undertakings offering similar service do not compete. The general view is that public utilities are monopolies but this statement is subject to many qualifi-

cations, in that as instances an electric utility has to contend with other forms of illumination and motive power, and a transport undertaking has to compete with other modes of locomotion. It would, therefore, be more correct to say that public utilities are limited monopolies, which result from the desirability of avoiding duplicate power lines, telephone lines, railroad tracks and gas or water mains in the area served. The limited shielding of public utilities from competition in the classical sense had led to the need for regulation so as to ensure reasonable rates to the public and a fair return to the undertaking.

Regulation of the Electric Supply Industry in India has been the scheme of electricity legislation since the law was codified in 1910, but a more conscious design to promote the ends of regulation came to be visible with the enactment of the Electricity (Supply) Act, 1948, by which Act the principle of regulation by legislation was laid down. The 1948 Act has since been modified in several respects by the Electricity (Supply) Amendment Act, 1956. The Act has thus established a 'yard stick.'

U.S. Regulation Practice

The financial principles embodied in the Electricity (Supply) Act, 1948, are, by and large, based on the United States rate regulation practice and a study of the ruling principles of utility regulation established by State and Federal Courts and Power Commissions in U.S.A. is therefore of great interest to the regulating authorities, public utility managements and the legal and Accounting professions in this country. The rate of return to be permitted to public utility undertakings is the central core of the problem of regulation. A reasonable rate of return is vital to the healthy functioning and continuation of public utility undertakings and so extensive re-examination of rate factors has in recent years been undertaken by Courts and regulation commissions in the U.S.A.

U.S. regulation practice stems from the Fifth and Fourteenth amendments to the Constitution which between them provide that no person shall be deprived of life, liberty or property without due process of law, nor shall private property be taken for public use without just compensation and none shall be denied the equal protection of laws. The basic principles adumbrated above first found fruition in a decision by the U.K. Supreme Court as early as 1898 in the landmark case Smyth V. Ames where it was laid down that under the pretence of regulation an undertaking cannot be forced to carry on operations without adequate reward.

The traditional procedure in the U.S.A. for fixing the return is to determine the 'Rate Base' (Capital Base in the Indian Law) representing the investment in the business, reckon the permitted operating expenditure and decide upon a percentage figure, applied to the rate base, so as to determine the return to be allowed—a process outlined in the Indian Statute. Many State Courts and Commissions have grappled with these fundamentals and the essence of what constitutes a fair return was propounded in the famous Hope case (Federal Power Commission *v.* Hope Natural Gas Co. 1944) where it was laid down that the process of regulation should square up with the "end result" that a utility should be allowed to maintain its financial integrity to attract capital and to compensate investor for the risks assumed. The language used in the decision was that the undertaking should be permitted to earn a reasonable return so as to "enable it to raise funds in the market necessary for the proper continuity of its public duties." Similar phraseology occurs in the Statement of Objects and Reasons appended to the Bill resulting in the Indian

Electricity (Supply) Act, 1948, and so the Legislature in India did not contemplate an end-result dissimilar to what has been regarded as the central core of U.S. rate regulution practice. Nevertheless we have witnessed in India in recent years the time consuming pageant of Rating Committees of practically little value resulting in greater exercise of police functions and many a time arriving at conclusions based on intuition with little regard to the ‘ yard stick ’ prescribed by law.

The power to regulate is a positive process with accent on development, and therefore, it is a well settled policy in U.S. that the prohibition of taking away property without due compensation extends to the earning power as well. Otherwise low rates might result out of regulation. Right to earnings is as much a property as the right to the property which can produce the earnings.

Risk Factors

What may be asked is a risk in a public utility ? Those who invest money in the Electric Supply Industry take a good many of the chances that persons engaged in other business take. Like other industries it must satify the consumers, run the gauntlet of good and bad times, strikes within itself, and in industries it supplies and revolutions in technological development. Minor changes in the field of technology attach a risk to various parts of the undertaking's installation. A possible risk is that the regulatory process might make a mistake—which until rectified might well result in greatly reduced earnings. A special character is that the business unlike others cannot be abandoned at will. These characteristics have led to the recognition that the strong arm of law cannot be used to reduce charges resulting in loss. Therefore, the principle has come to be accepted that just as the law is powerless to prevent injury (in case where economics of operation impose difficulties) so likewise it should not be instrumental to cause injury.

Unlike the Indian law which provides a yard stick to cover all units of the Electric Supply Industry, rate making in U.S. is not a Procrustean bed upon which the undertaking must be stretched or trimmed to suit any given dimension. Therefore, on the basis of a pattern established by case laws individual cases are adjudged giving regard to elasticity. This has led to returns—ranging from 5.75% to as high as 8.5% being permitted*, the guiding principles being to ensure safety to investment and incentive for further investment in a rapidly growing industry.

Flow of Capital

A utility may have characteristics of a limited monopoly, but capital is subject to the law of competition, flowing to the highest bidder ; other considerations being equal. It is also a truism that one cannot commandeer capital for public utility purposes ; to attract the yield must be sufficiently incentive.

That money cannot be attracted unless there is hope of adequate return was recognised by the Hadley Railroad Securities Commission appointed by the New Deal Administration of President Roosevelt, when it stated:

> “ We cannot secure the immense amount of capital needed unless we make profits and risks commensurate. If rates are going to be reduced whenever dividends exceed current rates of interest, investors will seek other fields......”

In this context, the ruling of one U.S. Commission is marked by refreshing candour.

> “ And while the Commission wishes to assure the great army of patrons of public utilities in this State that it will

* Common dividends in 1955, according to published statistics, have ranged between 8 to 20.3 per cent.

be vigilant in securing for them adequate service at reasonable rates, it is equally desirous of making it plain that capital invested in construction, development and extension, and especially in planting them in sections not now served, will receive consideration sufficiently favourable to make it an object to come here. When we lose sight of this duty, we become an instrument to kill enterprise, not to regulate it."

It is the law of economics that capital will not flow to an undertaking which faces the difficulty of paying a fair return to the investor. As the saying goes, one cannot "make bricks without straw," so either the community served furnish the needed return or the supply is likely to be curtailed. The awesome truth must also be faced that for necessary capital one must compete with a world in need.

Leavening of Growth

If a great and indispensable public utility is denied earnings to ensure a reasonable return, it is hardly to be expected that it will grow. Therefore, it is only proper that there must be a definite acceptance of the principle that the true welfare of the public is best served by the maintenance of a rate large enough to earn a return which will attract capital; which will readily permit of expansion and extension of the utility service and keep it in a high state of efficiency; which will attract the best type of sound, economical, aggressive managerial ability and in other ways stimulate productive activity. As one U.S. Commission has rightly stated:

> "Capital is not attracted to an enterprise which must constantly travel near the financial deadline which divides prosperity from bankruptcy."

In other words a utility should grow with the growth of the community it serves—or even leaven the growth of the community. Therefore, the interests of the two can not be separated and in the strict sense do not clash.

No life can be sewn into a neat conclusion beforehand. This is more so with institutions and industries which have to grow so as to grapple with society's needs. The pattern of regulation of the Electricity Supply Industry in India having already been set by law, the fundamentals are no longer a matter of dispute. But no living entity can remain stagnant. It must either grow or failing opportunities to do so, decay. It can only be hoped that legislative thinking in the country will march in step with the needs of the economy. ★

Metals are strong, wood is light and glass is transparent but plastics combines all these properties in a single material. Here is an excellent survey by a brilliant writer.

PLASTICS

VARKEY CHERIAN

Feature Editor, U.S.I.S., Madras

Plastics today touch the lives of the people at home, at work and at play. Their versatility is astounding— a plastic that makes a baby bottle also makes great balloons to explore the upper atmosphere. Plastics can be as strong as steel, as elastic as rubber, or as light and soft as feather.

Their uses range from home furnishings and building materials to dentures and surgical instruments, to boats and parts of automobiles, airplanes and even earth satellites.

Yet as little as twenty-five years ago most plastics were considered only as a cheap substitute for a natural product. Their development has been phenomenal, with new findings and new uses constantly growing. They are one of chemistry's most useful contributions to better living.

The beginning of plastics can be traced back to 1846 at University of Basel in Switzerland, when German chemist Christian Schoenbein found that cotton treated with sulfuric and nitric acids formed highly explosive gun-cotton. His discovery set chemists everywhere to experimenting with cellulose. That same year Louis Menard of France found that partially nitrated cellulose formed collodion. Two years later a young American medical student, J. Parker Maynard found that collodion applied to minor wounds formed a thin, tough film that gave protection from contamination. His discovery resulted in the commercial production of collodion as liquid " court plaster "—with unexpected reverberations. About fifteen years later a spilled bottle of collodion in the shop of an obscure young American printer opened the way to the plastics wonderland of today.

The printer was John Wesley Hyatt, a blacksmith's son. At the time he found the spilled collodion he was trying to invent a substitute for ivory used in billiard balls, to win a $10,000 prize offered by a New York firm. The collodion has hardened into a substance resembling ivory. Hyatt rented a backyard shed and began to experiment with collodion.

Rumours spread that he was working with guncotton and probably would blow up the neighborhood. He moved to a more isolated shed and behind bolted doors continued his experiments. In 1863, in this crude little shed, Celluloid was born—the first commercially successful synthetic plastic.

The beginning of plastics and the development of photography are curiously interlinked.

Celluloid was manufactured in New York, New Jersey, where lived also Hannibal Goodwin, a minister who liked to entertain his parishioners on weekday nights with lectures illustrated with slides. Unable to get certain slides he began to make his own by taking photographs of pictures in books and magazines. Celluloid was a local product, so he tried substituting it for the glass plates then used in making photographs. This was the beginning of the roll film, after developed by George Eastman, a one-time bank clerk whose love of adventure and photography led to his invention of the small hand camera. The first thin flexible film was produced by Eastman in 1889.

That same year a Belgian chemist, Dr. Leo H. Baekeland, came to America. He was on a visiting professorship and on his honeymoon. He liked America and decided to stay, going to work for a photographic firm.

Several years later he invented a sensitized photographic paper which made possible the first instantaneous printing of photographs. He sold the patent to Eastman for a reported million dollars.

Now financially independent, Baekeland returned to his first love—chemical research. In a backyard workshop and in the basement of his home he went to work. He wanted to reproduce the best qualities of the resin amber, with new properties to give it more practical use. He created "Bakelite," a hard tough plastic destined to have a profound effect on the American economy. The radio, telephone, automobile and other inventions created a demand for this new product.

Celluloid and Bakelite were first steps toward showing man how he could utilize the basic constituents of common, abundant raw materials to create new materials to meet his needs.

Plastics today have come a long way since their inception. They were are made by a process known as polymerization, which means making a giant molecule by joining together a large number of simple molecules. What kinds of molecules are brought together determine the end result.

For example, an important present day plastic, polystyrene, is obtained from coal and petroleum. By means of heat, pressure and chemical agents which speed up the rate of reaction without being changed themselves, the molecules form long chains that clump into granules. These are processed by heat into small pellets known as molding powder, one of the common forms in which plastics are supplied to the manufacturer. From these crude pellets born of coal and petroleum come an endless assortment of products—household articles, toys, phonograph records, industrial parts and a host of other things.

One of the most beautiful, as well as useful, plastics is acrylic resin, so clear it often takes the place of glass. In fact, a growing new use is in optical lenses for it can be ground to prescription — particularly valuable for children and for workers who need both glasses and eye protection.

Perhaps the best known of the cellulose plastics is the thin film called cellophane. It was produced first in America in 1924, by purchase of the Swiss patent of Jacques F. Brandenberger.

The plastic films have had an enormous influence on America's packaging and buying methods. They have made possible the pre-packaging of many fresh, perishable foods.

Through production of synthetic rubber fibers, and fabrics, such as nylon and rayon the plastics industry has revolutionized use of the conventional materials, besides holding out boundless potentialities for the future. ★

To provide employment to India's teeming millions, small industries alone offer immediate solution. Here is a magnificent account by an eminent specialist.

SMALL SCALE INDUSTRIES

T. K. PALANIAPPAN, I. A. S.

Director of Industries and Commerce, Madras

Industry is the driving force of economic development. Our country has the peculiar problem of providing adequate employment and income to vast numbers of people who live a sub-marginal existence. The development of small-scale industries is an important sector of economy for wide distribution of both economic activity and economic advantages.

While artistic handicrafts created by the imaginative genius and dexterous fingers of the artisans have always a demand from the art-loving and well-to-do people, both in this and in foreign countries the scope for their production and the sphere for their sales is limited as compared with the ordinary consumer goods of utility value which are produced and consumed on an extensive scale. In the case of handicrafts which are the material symbols of our cultural ethos, it is extremely important to preserve their cultural heritage and traditional symbolism and to ensure freedom for the deft fingers of the craftsmen to create things of beauty out of his vision and imagination. All that they need is redesigning of the articles to suit modern living and modern usage without destroying their basic charm and essential spirit to ensure a larger market. But if other cottage and small industries products should stand the competition of the products of large industries, they should use in an increasing measure small modern machines and tools and adopt modern techniques and better methods of management.

But modernisation is always resisted on account of the fear of consequent widespread technological unemployment. The International

Planning Team of Experts who visited the country under the aegis of the Ford Foundation has rightly pointed out that such resistance to modernisation based on fears of large scale unemployment and the perpetuation of inefficient out-moded methods have more drastically reduced employment than any modernisation would have done. Keeping in view that "man is more important than machine" technological improvement has to be so modulated and balanced so as to produce goods of quality at economic prices and in maximum quantities to satisfy human needs, which alone will ensure a steady market for them and regular work for the industry and its workers.

In this context, therefore, what are generally known as Small Industries occupy a very important place in the economy of the country. The small industries are those which involve relatively small capital investment and reduced scale of management but provide comparatively a larger scope of employment while adopting machinery, power and modern technological improvements as in a large-scale industry though in a small way.

In Government practice, units with assistance upto Rs. 5 lakhs and employing upto 50 persons per shift using power and employing 100 persons per shift without using power are classed under small-scale industries. This definition can serve only as a general guide for appraisal of enterprises coming within the scope of financial or other aids to be extended by the Union and State Governments from time to time.

In the past the small-scale industries were left to look after themselves without adequate facilities for economic survival and growth in the face of competition with large-scale units. The general impression has, therefore, been that small-scale industries could never have economic survival. That the small scale industries represent a stage in the evolution to large-scale industries, creating capital and trained skill has been ignored so far. The result has been that a large variety of consumer articles which could be easily manufactured in the small-units in the country are being imported from foreign sources. At the same time, considerable capital and enormous trained labour are idle for want of knowledge as to how they could employ themselves in industries of modern type, capable of being located even in rural or semi-urban areas.

For the true evaluation of possibilities it is very important to look at the advantage this country enjoys in possessing a wealth of artisans. India on the threshold of large-scale industrialisation can congratulate herself on so valuable a possession, because, from this base, generations of semi-skilled and skilled craftsmen of workshop assistants and qualified factory Superintendents can be raised, if an all-out drive for training is undertaken. This is imperative, if the number of genuinely gifted workmen should be turned into an equal number of qualified machine operatives for the country's already existing industries and for her new enterprises yet to be started.

Small-scale industry has for the first time in the history of our country become the subject of Government aid of the first order, and has before it an unique chance of filling the gap opened up by the modern large-scale industrialisation, viz. the gap between the country's immediate demands for trained manpower and light industrial equipment and the insufficiently developed resources of the country in either field. Realising the imperative need for filling the said gap by proper assessment and use of all available resources, the Madras Government have formulated a number of schemes for the development of small-scale industries during the second plan period, in conformity with the programme drawn up by the Union Government.

The principal needs of small-scale industries are imparting training and technical advice regarding the adopting of improved tools, machines and new techniques, supply of raw materials and power at reasonable rates,

supply of adequate finance on fair terms, facilities for importing or purchasing new machines, providing factory space (Industrial Estates) in order to conserve the capital of small entrepreneurs for utilization towards working expenditure, organising very small house-hold units into economically sound industrial co-operatives with facilities for better management, providing servicing facilities involving the use of costly machines and assistance in the marketing of their products. As a first step in this direction the Madras State Aid to Industries Act and rules have been amended so as to enable the speedy grant of loans to private industries and industrial co-operatives on a more liberal scale and at very low rates of interest.

Among the principal types of schemes included in the Plan of the Madras State are those for the establishment of Industrial Estates and colonies for which a provision of Rs. 95 lakhs has been made, loans to Industries on easy terms, establishment of model production, Training and Servicing Centres and general schemes for the supply of raw material, technical information etc. Prominent among the specific industries for which such centres have been sanctioned are carpentry, blacksmith, cycle-parts, locks, surgical instruments, hand tools, laboratory equipment, pressed die cast parts, sports goods, footwears, engineering, bolts and nuts, galvanised parts, electrical goods, glass and ceramics.

The total allocation of funds for the small-scale industries other than Industrial Estates for this State during the second plan period is Rs. 333.23 lakhs out of which a sum of Rs. 125.80 lakhs has been allocated for giving loans to the private sector and another sum of Rs. 41.74 lakhs for the formation of industrial co-operatives. It will thus be seen that about 50 per cent of the total plan provision has been ear-marked for the private sector, and the balance has been set apart for specific schemes sponsored by the Government. The Departmental units owned by the Government are set up for the time being only with a view to maintaining the spirit of resourcefulness and self-help among the private sector and in the case of industries not yet fully developed.

The increase in the investment activity which the developmental planning will involve, is bound to enhance existing demands for consumer goods and create new ones. In a country like India with vast distances and a large potential market, these demands can and ought to be met through efficient production by decentralised small units. There are other reasons also in favour of a wide dispersal of industries. With the development of transport, communications and power, the economic advantage in favour of concentrated areas like cities and towns also narrows, while the disadvantages against them due to the inevitable social evils such as emergence of slums, increased incidence of disease, high cost of living and labour problems continue. Viewed also from this aspect and also from the point of view of raising incomes in rural and semiurban areas, the small scale industry has an unique place in the country's economy deserving special attention from the Government as well as the private sector. In the conditions obtaining in our country the small industries and cottage industries are the main hope of stepping up economic possibilities and employment opportunities.

* * *

The rise of Austria to industrial prominence is brilliantly sketched in this most illuminating article.

AUSTRIA'S ECONOMY AND EXPORT TRADE

Experts as well as the general public have often called the economic development of Austria after World War II an "economic miracle". The term seems not to be ill-applied since after the cessation of fighting in 1945—the year "zero"—no auspieces were visible on the economic horizon which, according to the laws of economics, would have permitted the conclusion that the coming thirteen years would see the economic rehabilitation of the country. Both geographical conditions and the political constellation at that time—from the economic aspect—did not tend to the advantage of Austria: a situation little changed to this day.

Geographically, the territory of the Austrian Republic with its seven million population borders on the highly-developed Swiss Federation along the short western frontier, with its short eastern frontier adjoining Hungary, which today belongs to the Eastern Bloc. Along Austria's long northern border extend Western Germany and Cechoslevakia, the latter also located behind the Iron Curtain, in its other long border in the south faces Italy and Tito's Yugoslavia. Thus squeezed in between East Bloc countries and the highest-industrialized countries of West Europe, Austria is largely to rely on herself. In view of its constitutional neutrality it does not belong politically to either of the two great blocs, while economically being a member state of the Organisation for European Economic Cooperation (OEEC).

Owing to the Alpine character of Austria, only about 50 per cent of the country is cultivated area, with 60 per cent thereof formed by grassland (meadows and pastures) Despite this disadvantageous proportion it was largely possible, however, to meet food requirements by domestic production. Among the unfavourable geographical factors, the long-stretched form of the Austrian territory has a marked effect on communications as a cost-raising element affecting overall

economy. The transport situation of Austria, with no direct access to the sea, is typically that of a land-locked country, and in no way relieved by the country's share in the course of the Danube which, downstream issuing into an inland sea of third rate order in the east, flows in opposite direction to the destination of the bulk of Austria's products. Moreover, as a result of political developments, the Danube has lost its former importance as a main transport artery.

Historically, until 1918, Austria was part of the economically more or less self-sufficient Hapsburg Monarchy, within a total population of 50 million. Owing to this desintegration, the industries enterprises, and the resulting situation even before the beginning of the great international economic crisis caused a chain reaction of business breakdowns in Austria. After the incorporation of the country into the German Reich, in 1938, the Austrian economy, again denied consideration of its own necessities, was made to serve the armament and the economic requirements of warfare of the "Third Reich". In this process, a large-scale heavy industry was set up on the basis of the country's enormous hydropower resources, its wealth in timber and its deposits of iron ore and oil. With most parts of the projects still unfinished at the end of World War II, new handicapped enterprises added to the old ones existing from 1918, thus immensely increasing operational difficulties. For a correct estimation of the starting position of Austria's rehabilitation in 1945 it has to be recalled that the country, after World War II until the end of 1955 was the scene of quadripartite occupation, initially resulting in the paralyzation of all economic inter-relations between the four occupation zones. In the eastern zone, moreover, the Soviet Union, under the title of so-called "German property", seized numerous enterprises including such Austrian assets as had nominally been transferred to German ownership during the war, not exempting even road building sites and, above all, the entire complex of the Austrian oil fields, which was organized as a separate economic group called "USIA". This huge complex comprising 420 industrial and trade enterprises, among them the Danube Shipping Company and almost, all technological installations for oil production in Austria, was operated for Russian account, paid no taxes or duties to the Austrian Government and, as an extraterritorial agency, exported, among other commodities, 11 million tons of Austrian oil without payment to Austria.

War damages were enormous. In the sector of installations and buildings alone, they amounted to 750 million dollars, not including the lesses by dismantlings which were carried out by the occupation powers and, according to American estimates, ran up to 400 million dollars. 175, 00 Austrians had been killed in the war; 117,000 were missing; and the absence of several hundred thousands, detained as prisoners of war, was severely felt when reconstruction started. On the other side, the starving country was flooded by more than a million refugees. That, in short, was the situation at the beginning of the remarkable economic recovery of Austria.

In the economic development of Austria since 1945, three different stages can be clearly distinguished. The period from 1945 to the turn of 1947 was characterized by hunger and misery, the lowest point being reached in 1946.

The situation began to improve in 1947 when a thorough monetary reform was started which initiated the secondperiod in Austria's postwar economic development, extending until the end of 1953. This period is characterized by American ERP aid and the synchronous planned reconstruction of Austria's economy. While avoiding any radical intervention, the currency reform eliminated the exclusive volume of monetary circulation built up in wartime and, later on, increased by the issue of occupation money and the lack of consumptiou possibilities. The establishment of a more appropriate proportion between production and monetary volume stimulated production, encouraged saving, and widely stopped blackmarketeering. The transitional period between UNRRA and ERP aid was bridged by interim aid schemes of the USA, so that no major gaps occurred in the supply sector until the actual beginning of ERP in autumn 1948.

The year 1948 marked a decisive turn in Austria's economic development. The complex preparatory planning for the implementation of the ERP had revealed two alternative courses which could be taken and between which a choice had to be made by Government and economy. It was necessery either to liquidate the uneconomic industries inherited from two world wars, consisting primarily of plants in the sector of the basic industry, unfinished, wardamaged, antiquated, or not fitting into the overall structure of the domestic economy, and, following the original trend of the Austrian ecouomy, to give priority to the processing industries or to develop the existing ineffective and incomplete industries at immense cost so as to create an organism of entirely new economic structure characterized by heavy and basic industries.

The nationalisation in 1946/47 of important basic industries and of the power sector—a measure adopted in part as a policy of protection against confiscation by the occupation powers—turned the scales from the outset in favour of the second possibility. Relevant action, however, was very difficult to take in view of the disproportionate size of the interprises which, planned and initiated during World War II with regard to a much larger economic area, did not fit in the economic pattern of Austria. But finally, the decision in favour of the heavy industries brought about a thorough change of the economic character of the country within a few years.

During the period from 1948 to 1953, a total of 20 billion schillings was invested in Austrian Industries, with slightly over two billion allocated to the iron and steel industries, 1.3 billion to the paper industry, and proportionate amounts channeled into the metal processing, textile, chemical, and other industries

Whatever figures may be chosen, they all reveal the same impressive picture of an almost unbelievable economic advance of the little country. The foreign trade in both directions showed a similarly remarkable development, especially as Austria, in the export sector was able to open up entirely new markets for its industries. The loss of its former outlets in Southeast Europe could be wholly compensated by gaining ground on new markets almost in all parts of the world.

Only a few years ago an export value of one billion schillings would have appeared to Austrian official circles as the maximum attainable, while today more than double the amount has been reached. This development has reversed the economic situation of Austria as a whole by 180 degrees: the country, for decades a debtor nation, from 1953 on became a creditor nation, and in 1957 could even participate in economic aid extended to France through the European Payments Union.

Of course this economic upturn did not continue uninterrupted and without setbacks, and various critical situations had to be coped with. The year 195?, in which the imminent danger of inflation was finally averted, marked the beginning of the third and last period in the postwar rehabilitation in Austria. On May 15, 1955, negotiations between the four occupation powers and Austria, protracted over more than twelve years, were successfully concluded by the signing of the State Treaty which ensured the independence of the country and the withdrawal of the occupation forces. By the end of October 1955, the last foreign soldier left Austrian territory and immediately thereafter the Austrian Parliament proclaimed the constitutional neutrality of the country. Through the State Treaty, all those assets and industrial installations which for years had been outside of Austrian control were returned to national administration while Austria, in exchange, had to undertake certain compensatory deliveries to the Soviet Union. These commitments and the financial assistance to be rendered to enterprises in a precarious situation as a result of military occupation and undetermined legal conditions, imposed new burdens on the Austrian economy. It may be regarded as testifying to the sound basis of the Austrian economy reconstructed during the last ten years that the compensatory commitments towards the USSR could be duly met and that it was possible to a large extent to remedy economic predicaments inherited from the occupation period. Austria has benefited to a more than average degree from the international boom, and the recent recession has hardly been felt in the country so far, since, owing to the relatively large reserves accumulated, export losses in recent months could be offset by a stimulation of business on the home market. Since, moreover, Austria's neutrality proves to be a trade-promoting factor, Austrian economic circles regard the future development with a certain optimism.

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